THE BOOK OF KNOWLEDGE

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A GIANT EAGLE, THE MONARCH OF THE AIR

No bird builds a more inaccessible nest in which to lay its eggs and bring up its young than the eagle, which is monarch of the air as the lion is of the forest. To its solitary home on some rocky ledge it carries the food for its young—animals, birds, and fishes all being heartlessly seized for this purpose. The eagle is a fierce enemy even for man to face.

The Book of Knowledge

The Children's Encyclopædia

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Volume V.

NEW YORK: THE GROLIER SOCIETY
LONDON: THE EDUCATIONAL BOOK CO.

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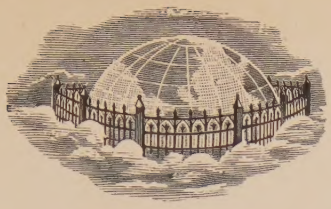

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WHAT THIS STORY TELLS US

THE world is made of about eighty kinds of matter which we call elements. We must be quite clear in our minds about what an element is. An element is something which is all made of one kind of atoms. Hydrogen and oxygen are elements, but water, which is formed by hydrogen and oxygen, is not an element, because it is made by hydrogen and oxygen and can be broken up into them. No chemist can break up an element into anything else ; though we are just learning now that even the atoms of the elements may be changed by forces within themselves. So that the elements are the very foundations of the world, the things from which all other things are made. And, though there are about eighty of these elements, there are two chief things we must remember about them : a few of the elements are much more important than all the others put together, and the whole of the elements are related to one another. Here we read about some of the chief elements ; where they are found, what they do, and how they help each other in the work of the world.

THE MOST IMPORTANT ELEMENTS

CONTINUED FROM 1196

WE all know coal; we have all seen diamonds and charcoal; and we have all used what is stupidly called a lead pencil. A wonderful and most important element it is that makes all these very different things. It is nothing like as abundant in the world as any of the three gases we have talked about, but it is no less important, because it gives rise to a countless number of compounds. It is also, like each of those three gases, a necessary part of all living creatures.

This element is called carbon, from the Latin word for charcoal, which is carbo. Nothing could be more different, to look at, than any of those gaseous elements we have talked about. We know carbon in many forms, but usually think of it as a black powder, like charcoal. Sometimes, however, it occurs as a heap of tiny crystals, and that is what makes the "lead" of lead pencils. The name is very stupid, because lead is another element, and has nothing to do with lead pencils. Carbon also occurs as larger crystals of a different shape, called diamonds.

These are rare, hard, and bright, and therefore valuable ; but they are not worth the life and money which are spent in digging them out of the earth, and therefore we must hope that the chemists will soon learn how to make diamonds, so that all this life and money may be saved, and so that everybody may have as many as they please. Beautiful things cannot be too common. Already chemists can make very, very tiny diamonds.

If you make a diamond very hot, in the absence of air it swells up and makes a black stuff, which is charcoal. If air is present, it burns and makes common carbonic acid gas. At ordinary temperatures carbon, then, unlike these other elements we have been talking about, is not a gas, but a solid. It is, so to say, frozen. When it is made intensely hot, we find evidence that it becomes a gas. It seems, as it were, to jump the liquid stage, so that no one has ever seen liquid carbon. It is twelve times as heavy as hydrogen. We usually represent it in chemistry by a capital C ; so that you now know what the capitals H, O, N, C mean. Water is made of H and O, ammonia of N and H, and a gas called marsh-gas or firedamp, much feared by miners, is made of C and H.

It was a great Frenchman, Lavoisier, who showed that diamonds were made of carbon. He belonged to the class of people against whom the nation rose during the French Revolution, and they cut off his head, saying "The Republic has no need of chemists." The Republic knows better now, and honours its great thinkers and men of science.

One of the interesting ways in which we find carbon is from charcoal. It is

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usually made from wood by charring it, and in some parts of the world wood charcoal is used as fuel. It goes into gunpowder also, and at one time was much used for getting rid of bad smells, since it has a wonderful power of storing up gases in itself.

But, in whatever form we find carbon, we can never think of it as a metal, though it is solid, and may often be very hard. Though the diamond is vastly different from charcoal, yet neither the one nor the other, nor any other form of carbon, is in the least like gold or silver or lead, or many other solid elements which we call metals. We may learn, then, that the solid elements may be divided into groups, as, indeed, all the elements may, and we shall think of carbon as the best representative of the solid elements which are *not* metals. There is no need for us here to mention all the various elements. Most of them are quite unimportant except to the chemist. But we must have some idea of the different kinds of substance which we find among the elements—for instance, a gas like oxygen, a solid like carbon, and a solid of such a very different kind as gold. There are also a very few liquid elements, of which the most remarkable is mercury.

SOME OF THE CHIEF SOLID ELEMENTS THAT ARE NOT METALS

Among the solid elements that are not metals, we must mention one or two on account of their importance.

Perhaps, after carbon, sulphur is the most important of these non-metallic elements. Like carbon, it is a solid, by which we mean that it is a solid at ordinary temperatures. Of course, we believe that any element might possibly exist either as a solid or as a liquid or as a gas, according to the conditions it is put into. We must not forget this, for we are apt to say that such and such a thing is a gas or a liquid or a solid, though all we mean is that it is most commonly met with in that state. Sulphur, then, though it is a solid, can easily be made liquid, and can also be quite easily made into a gas. This element is yellow. You have very likely seen it as a yellow powder. Like carbon, it has none of the appearance of a metal; and, also like carbon, it does not melt in water. Yet. again, we find it in many different forms, just as we saw with carbon. The difference between the "lead" of pencil and the diamond is that the carbon forms crystals of different shapes in the two cases. In the same way sulphur forms different crystals in different cases, and looks different accordingly. This element has a special importance because it is very commonly, if not always, found in living matter. It is used by doctors, by makers of matches, and for other purposes. Most of it is obtained from places like Sicily, where quantities of it are found either on the surface or not far from the surface.

TWO ATOMS OF OXYGEN AND ONE ATOM OF SULPHUR MAKE A MOLECULE OF GAS

Both carbon and sulphur can be oxidised, or combined with oxygen, and in each case the result is a gas. In order to make this gas, which is, of course, a compound, two atoms of oxygen unite with one of carbon to make a molecule of the gas, and the same is true in the case of sulphur. Now, since S stands for sulphur in chemistry, we can easily represent the two gases which are made by the oxidation, or burning, of carbon and sulphur; the one will be CO_2, and the other SO_2.

These oxides, as they are called, are very much the most important compounds into which carbon and sulphur enter. The first of them is called carbonic acid gas, which, as we know, is present in the atmosphere, and is a product of breathing, while it is part of the food of green plants. The corresponding oxide of sulphur is not so important as carbonic acid, but it is important, for it goes to make various salts that are found in the soil and in the sea, and are used by vegetable life.

HOW DIFFERENT ELEMENTS ARE MADE IN THE SAME WAY OF THE SAME STUFF

Before we go on to the metals or the metallic elements, there is a little group of elements that we must mention, since they stand quite in a class by themselves. You may know the names of two of them, at any rate. They are called *fluorine*, *chlorine*, *bromine*, and *iodine*. The first two are gases, the third a liquid, and the fourth a solid, but not a metal. Bromine and iodine are got from the ashes of seaweed, which gets them from sea-water. The interesting thing about these four elements is that,

though they are very different from each other in many ways, yet no one can study them without seeing that they must be relations of each other, and so they are. They are almost the best instance we know that teaches us how the elements can be sorted out into groups, and the lesson which these four elements teach us has, in the last few years, been seen to be one of the most important lessons in the world. It is that, though we talk about oxygen and iodine and gold as elements, yet they are not utterly different from each other; and if we could only see them close enough, we should find that, at bottom, not merely are they related to each other in groups, but they are all made on the same principles, and of one and the same stuff.

We shall come back to this great discovery afterwards. Meanwhile, we must remember that, though we speak of elements, yet these elements are related to each other in groups, and that their relation means something.

The elements that make up a countless number of salts

The four elements we have just named, which are so strikingly related to each other, are called *halogens*, which really means salt-makers. They all form compounds very like common salt, and they can turn each other out of their compounds in a regular order and very strikingly. The number of salts that these salt-making elements can form is almost numberless. The standard and type of them all, however, is the commonest and most important salt in the world, which we all know very well, and which most of us just call salt.

Like all salts, common salt is a compound. Its molecule—the smallest part of a compound that can exist—is really a very simple one, for it merely consists of one atom of the salt-maker chlorine, and one atom of a metal called sodium. In chemistry, we represent sodium by Na, which are the first two letters of its Latin name; and chlorine we represent by Cl; we cannot use C by itself, for that has been already taken by carbon. Common salt, then, is called by chemists sodium chloride, and it is represented like this, NaCl, which tells us its composition, the most important thing about it. It is the commonest and most important salt in the world. There are enormous quantities of it in the sea, and in various parts of the world it is found as what we call rock-salt, which has been formed in past ages by the drying up of bygone seas. Some of the salt we use to-day is obtained by the drying up of sea-water, by which we mean that the water passes into the air in the form of a gas, and the salt which was melted in it is left behind. Salt is found in every living creature, animal or vegetable. It is absolutely necessary for all life—a food which we cannot do without.

Salt is one of the commonest necessities of life

It is very important to know how much of this sodium chloride, or common salt, is found naturally in various foods. Milk contains enough of it, meat also contains enough of it, but other foods do not. So, practically, we have to add salt to our food, and this is true all over the world. A tax on salt is therefore a tax on a necessary of life. Some of us think that the tax on salt in India is a cruel and wicked thing, though it is a very sure way of getting money, since people must have salt or die. But not only is salt a necessary food for us, as for all living things, but it is also specially valuable as a preservative of other kinds of food, such as fish. Those who understand the chemistry of salt and its relation to life are inclined to think that it is almost the last thing in the world out of which a government should make money.

There was a time when all the elements were divided into two groups—the metals and the non-metals. We group the elements differently nowadays.

The six most useful metals, and what a metal is

We know that there are some elements which are not quite metals, and yet are very nearly metals, and we know that mercury is a metal, though it is not even solid. But still it is worth while to group together a number of the elements as metals, and this number now is something like sixty. In ancient times six metals only were known—iron, copper, tin, lead, gold, and silver. These are still the most widely used metals, though many others have now been found.

Their names are sufficient to give us quite an idea of what a metal is. In

general, metals are solid and opaque, which means that they do not let the light through them; they are heavy, and have a particular sheen or metallic lustre. There are exceptions to all of these characters, as, for instance, mercury, which is liquid, and the metal sodium, which we have just been talking about, which is not heavy, but light.

THE DISCOVERY OF METALS CHANGES THE HISTORY OF MEN

Of course, when only six metals were known, gold was the most costly of them—the noble metal. But now we know many metals which are far rarer and far more valuable than gold. Many of these can be used for special purposes for which neither gold nor any of the common metals is of any use.

So the science of preparing metals is a very important one nowadays, and we now realise that the history of our knowledge of the metals, how to prepare them and how to use them, is a part of the history of mankind. We know now there was a time when men were unable to use any of the metals. They had to make their axes and weapons of stone. After this Stone Age, which men have passed through at various times in all parts of the world, there came the ages when men learnt how to make weapons of metals, bronze or iron. Far more can be done with metals and tools made of metal than with any that can be made of stone. Thus the discovery how to get iron out of iron ore, as it is called, has always meant, when it was made in any part of the world, a new stage in human history there.

IRON IS BY FAR THE MOST VALUABLE OF ALL THE METALS

Though the metals are all more or less like each other, yet they are different in many ways. Some can be hammered flat, some can be drawn into long wires, some will stand great strain, and so on; but of all the many metals by far the most valuable, *in the real sense of valuable*, is one of the commonest and one of the first to be known—namely, iron. This, of course, is an element, and has its own symbol or letter. We do not call it I, however, because that stands for iodine, but we call iron Fe, from its Latin name, *ferrum*. This element is valuable, because it serves man in so many ways. Fortunately, it is very common, though not much of it is to be found free. It is usually found burnt, combined with oxygen; and the way in which to get the iron by itself is to take the oxygen from it by means of carbon.

Men certainly knew how to do this many thousands of years before the birth of Christ, and it was not the kind of thing which, once learnt, would be forgotten, so vastly superior to anything that was known before were the weapons and tools which could be made of this element. In some parts of the world bronze was used for a period before iron was discovered, so that there was a Stone Age, a Bronze Age, and an Iron Age—bronze being a mixture of tin and copper. Long years after this, there is no doubt that people will describe the age in which we live as the Steel Age. Now, steel is not an element, and we may call it a special kind of iron, but we can do things with steel which could never be done with iron; and perhaps steel is as great an advance upon iron as iron was upon bronze or stone.

HOW THE WONDERFUL THING CALLED STEEL IS GOT FROM THE IRON

Nearly all the iron we find is more or less impure, and it all contains a quantity of carbon, as well as many other elements. If we turn out all these other elements except the carbon, if we allow just the right amount of carbon to stay in the iron, and if, in so doing, we comply with a great number of conditions as to cooling, and so forth, then we get that wonderful thing—steel, which we think of as iron with some carbon in it. It has all the virtues of iron, and far more; it is stronger and less brittle; it can take a wonderfully delicate edge, and it will stand an amazing strain, whether used for buildings or bridges or ships or motor-cars.

Now, since steel is so much more wonderful and useful than iron, it seems a very poor explanation of its properties to say that it is just iron with a little carbon in it. Those who are studying steel now take special pains to find out what it is that makes it so useful, or what it is that makes the difference between the steel which lasts and stands strain and the steel which snaps and wrecks a train or lets a bridge crash. That is not merely a

question of iron with a little carbon in it; it is a question of the way in which the steel forms crystals as it cools and becomes solid.

We think of salt and snow and some of the medicines we have to take as crystals. Very few of us have ever thought that all the metals are made of crystals, too, but this is really so. Of course the crystals are very small, and very tightly and beautifully fitted to each other, but a lump of gold or a bar of iron is made of crystals just as certainly as a ball of snow or a piece of ice.

THE LITTLE CRYSTALS THAT GIVE IRON AND STEEL THEIR AMAZING STRENGTH

It is the crystalline structure of iron that makes it so useful, it is the particular crystalline structure of iron containing carbon, in the form of steel, that makes steel the wonderful thing it is, and it is a question of crystalline structure that decides whether there shall be an accident or not in any of the millions of cases in which steel is used every day. If we examine steel under the microscope—which has only lately been used for the study of metals—we can now learn the difference between the kind of steel that you could trust your life to and the kind of steel that would betray you if you trusted it. In the good steel the crystals are beautifully and regularly arranged, holding on to each other on all sides, nor is there any place where some of the carbon has got by itself in between the crystals. This is just enough to tell us of the kind of study now being carried on in various parts of the world, especially in the United States.

Gold and silver are very nice and useful metals in their way, but if all the gold and silver in the world were to vanish at this moment we should soon get along just as well without them. I mean that the use of them is not a real use, like the use of iron, or, at least, the real use they have is only very slight.

WHY GOLD AND SILVER ARE CALLED THE NOBLE METALS

For some purposes we want to have something that is very thin, and this is one of the real uses of gold, for it can be beaten out into thinner leaves than anything else. We say that it is malleable, a word which comes from the Latin, and simply means hammer-able.

Gold and silver are called noble metals, not so much because they are rare or beautiful as because they do not rust. Most metals, when exposed to the air, begin to get rusted or burnt. If there is only a small amount of water in the air, this rusting goes on very quickly. Steel, of course, rusts. You must have noticed that with a pocket-knife.

Now, gold and silver do not rust. They can be exposed to the air, but they do not get burnt, or oxidised, by it. We know that silver things will tarnish in a room, but that is because they are attacked by the sulphur of the air. They do not rust. This is one reason why gold and silver are called noble metals, and another reason is that it is difficult to melt them. Almost the only thing that will melt gold, for instance, is a mixture of two very strong and violent acids—nitric acid and hydrochloric acid. Either of these will make short work of most metals, but neither of them alone can touch gold; only a mixture of them can do so; and so this mixture was long ago called *aqua regia*, meaning the royal water, because it was able to melt the royal or noble metal—gold.

WHY ONE END OF A POKER IS HOT IF YOU PUT THE OTHER END IN THE FIRE

Though they cannot be attacked by the air or by most other tnings, gold and silver are very soft, and when they are used to make coins various other metals have to be added to them, or they would very soon rub away.

We have seen that gold cannot be oxidised in the ordinary way. Even when very special methods are used we still fail to oxidise gold. If we make silver exceedingly hot, however, and expose it to air or to oxygen at a very high pressure, it can be oxidised.

One of the features of the metals in general is that they conduct heat very well. That is why one end of the poker becomes hot when the other is put in the fire, iron being a good conductor of heat. This means, of course, that metals are the worst things we could use to make clothing of; they would make what we should call cold clothing, because it would conduct heat away from our bodies quickly.

Metals are also the best conductors of electricity. No one has yet explained what it is in a metal that makes it conduct heat or electricity so

well, but it is at least very interesting to remember that, as a rule, the things which conduct heat best are also the things which conduct electricity best. Some day we shall probably learn that it is one and the same thing—perhaps the way in which the atoms of these things lie together—that explains their conducting of heat and electricity.

Electricity, about which we shall read later, is every year being used for more purposes. It is the best of all means by which power can be carried from the place where it is obtained—as, for instance, by burning coal—to the place where it is wanted to be used.

WHY COPPER IS USED ALL OVER THE WORLD TO CARRY ELECTRICITY

Hence we yearly have more and more need for things that will carry or conduct electricity, things that it will run through as if it were water running through a pipe. This is one of the great reasons why we use the metals nowadays. The three metals which conduct electricity best are gold, silver, and copper, and as copper is very much the cheapest of the three, it is now used all over the world for carrying electricity. Like silver and gold, a certain amount of copper can be found free in the earth, and it is free copper that we require; but it must be very pure, for if it has any traces of other elements in it, it does not conduct electricity anything like so well. So all the copper which is used for conducting electricity has to be specially prepared, and this is done by splitting up compounds of copper, dissolved in water, by passing an electric current through them, just as we saw that we could split up water itself by passing an electric current through it. A great advantage of copper is that, like silver and gold, it is not burnt or rusted or oxidised at ordinary temperatures.

MERCURY, THE WONDERFUL WATER-SILVER, THE ONLY LIQUID METAL

Just a word must be said here about mercury. It should always be thought of together with copper, silver, and gold, for with these three elements it forms a group of four, which are all related to each other and somewhat like each other. Mercury is, however, peculiar, because it is liquid—the only liquid metal there is. Small quantities of it, as of the others, are found free in Nature. Like the others, it is a very good conductor of electricity. It is a very useful metal, not only because it conducts electricity so well, but also because it can be spread on glass so as to make mirrors. We call this silvering the mirrors. But mercury, or quicksilver, though it looks like liquid silver, is not silver at all, but a perfectly distinct element. When mercury is heated, it expands—that is to say, it occupies more space—in a very regular way, and so it is used in thermometers for measuring the temperature. In somewhat the same way it is used in barometers for measuring the pressure of the air.

Unlike the three other elements of this group, mercury is also a valuable medicine. In some kinds of illness—some of them not serious, and others as grave as illness can be—mercury is not merely the best medicine, but the only one worth mentioning. I had almost said that it saves as many lives every year as are destroyed by men's hunger for silver and gold, but I am afraid that would be an exaggeration. At any rate, if we were allowed to keep only one of this remarkable group of four metals we should certainly choose mercury, and if we were allowed to keep two it would be mercury and copper.

A WONDERFUL GROUP OF GASES AND WHAT THEY TEACH US

There is no need to say anything now about the other metallic elements, though we shall have something to say about some of their compounds afterwards; nor need we say anything about other elements that are not metals, such as arsenic and phosphorus. We must pass on to some wonderful elements that we have not known very long, which will prepare us to learn how all elements are related to each other, and actually made out of a single kind of stuff.

First of all, there is a wonderful group of gases which exist in the air in very small quantities, and have only been found in the last few years, though everyone thought that the composition of the air was completely known. These gases are not important in themselves; they play no direct part in our lives; they only exist in tiny quantities; and they seem to do nothing in the air or anywhere else.

But they are enormously important on account of what they teach us, and their relation to other elements. The first of them, *argon*, was found fifteen years ago, and since then it has been found that what was called argon did mainly consist of a true element to which that name is still given, but also contained very small quantities of four other elements which are now known as *helium*, *neon*, *krypton*, and *xenon*. Helium was already known as existing in the sun, and also in a rare mineral, but no one guessed that it was contained in the air.

THE FIVE MISSING ELEMENTS THAT FIT INTO THE GAP OF KNOWLEDGE

These five elements form a true group, quite as definite as the group of four metals about which we have just been speaking. They have certain common properties which show their relation and distinguish them from all the other elements. More than this, long before their discovery all the known elements had been fitted into a table which showed that they were related in certain groups, and that these groups were related to each other. In this table there was one very conspicuous gap; one of the groups that should have existed in it did not exist at all, it seemed. These five new elements are the missing group, and fit exactly into the vacant space in the table. If there were nothing more to say about them than this, their discovery would still be a great event in the history of knowledge. But, indeed, there is much more to say about them, for we have lately learned where they come from. The first of the series, helium, is the lightest but one of all the elements. We have learned that it is made by the breaking up of one of the heaviest of the elements. Last year we learned that other members of the series are similarly made, and there is now no doubt that what we call the elements are not merely related to each other, but that they can be actually transformed into one another.

HOW THE ELEMENT RADIUM HAS CHANGED OUR IDEAS OF THE WORLD

For a moment, then, we must leave this little group, and must look at the heavy element, as different from any of them as can be, although it is, nevertheless, their parent. On page 655 of this book we have already had something to say about the wonderful element radium, since we have lately learned that it is a producer of heat, that it is distributed throughout the crust of the earth, and therefore helps to keep the earth warm. Nothing more important could be said about any element, as the warmth of the earth is necessary for life, and as the duration of that warmth must decide the duration of life upon the earth.

But radium is really of equal importance to the world of ideas. It gives us not only heat, but new truths, the greatest of which is that the elements must now be looked upon almost as we look upon different kinds of animals and plants, and not as things which have been what they are now and different from each other since the beginning of time. We have little doubt now that radium itself is formed by the breaking up of the atoms of another element called uranium.

WHAT THE WORLD MAY LEARN FROM THE BREAKING UP OF ATOMS

But radium shows this breaking-up process in its own atoms much more distinctly than does uranium or any other element we know; and it is this breaking up that gives radium its astonishing properties, such as the production of heat and of electricity, and also of various kinds of wave-motions in the ether which are very similar to the wave-motion we call light.

It was this production of heat and electricity, of X-rays and of various other kinds of rays, which first excited our interest in radium. But now we are learning that these things are only the accidental results, so to speak, of the real and essential thing which is always happening in radium, and to which they are all due. This essential thing is that the atoms of radium are breaking up into smaller atoms, several of which have now been recognised. Yet radium is a true element and not a compound, for all the atoms making it are of one kind, as we read on page 1372. We must first see what atoms have been recognised as the offspring, so to speak, of the radium atom, and then we must try to understand the quite tremendous meaning of this discovery, one of the most important that has been made since the dawn of human knowledge.

The next story of the earth is on page 1419.

THE WONDER OF DRIPPING WATER

This is the inside of a cave on Margaret River in Western Australia. Thousands and thousands of beautiful white columns hang down from the roof, long and short, ending in perfect star shapes. They are called stalactites. Seen against the dark cavern, they look like a shower of stone meteors; but they are really formed by water dripping from the roof, drying up and leaving mineral matter behind.

This is another view inside a cave in Western Australia, which looks almost like a dry goods store. When the cave is lit up with electricity it is seen to be hung with pure white stalactites in the form of alabaster columns, showing light through their edges. Many of them glitter like gems, and others form into shapes like folded lace-edged shawls, rugs, tents, and other wonderful things. You might fancy some of them were icicles.

Elizabeth Fry visiting the prisoners in Newgate Prison

THE GENTLE LIFE OF ELIZABETH FRY

And How She Reformed the Prisons

CONTINUED FROM 1180

PERHAPS you have never visited a prison. It is strange to hear the great gate close behind you, and to find yourself standing inside of the high spiked walls which prevent criminals from making their escape into liberty. If you have known this experience, you will understand how pitiful are those words in the Church Litany: "*That it may please Thee to have pity upon all prisoners and captives.*" It is terrible to be a prisoner.

But it was worse, infinitely worse, to be a prisoner a hundred years ago; and for poor women it was so horrible that no language can describe their sufferings. Women, innocent or guilty, those who had been tried by the judge, and those who still were awaiting their trial, women of education and gentleness, and women so low that they were lower than animals—all were thrown together into one prison, among desperate and evil men.

And all this was changed by one noble-hearted woman.

In those days there lived a Quaker lady named Elizabeth Fry, who was deeply religious, and lived her religion by trying to help others. She believed that bad people would become good if they were helped. She herself had once been vain and fond of frivolity. She had known the difficulty of becoming serious and good. When someone asked her about the crime of a certain prisoner, Mrs. Fry would answer, "I never ask the crimes, for we have all come short." It was not of the crimes she thought, but of the soul; she looked into the eyes of prisoners, not into their records.

This noble lady had heard about the prisoners in Newgate, and asked permission to visit them. The first time she went among them the turnkey accompanied her; the second time she went alone. The governor told her of the danger, and advised her to leave her watch behind, saying that he himself would not dare to go alone into that seething yard of crime and sin. But Elizabeth Fry went alone, and she won the hearts of the women prisoners by sheer kindness and sympathy. For the first time they looked into the eyes of a good person, who believed that they could be good. That helped them.

She set herself to start a school among these terrible prisoners. The officials scoffed at the idea, and told her it would be a failure. The school became a great success. Then she set her heart upon giving the prisoners interesting employment. Again, the officials said the idea was impossible. But the industry also became a great

success. Remember that even the kindest people in the world will always tell you that every scheme for the lifting up of fallen people is useless—and it would be useless *in their hands*. It was because Elizabeth Fry *knew* that her schemes would not fail that she carried them to victory. She had faith. She knew that God is on the side of good, and that evil must yield to righteousness.

This good woman was the daughter of a rich man and the wife of a rich man. She might have lived a life of idle enjoyment. She might have sent subscriptions to help good works, and herself remained in the comfort of her home. But every morning when she woke, her thoughts were :

Of the hearts that daily break,
Of the tears that hourly fall.

She cared for the vilest; she sought the most hopeless. So we find her praying on the deck of convict ships, reading the Bible in gaol, sitting all night in the condemned cell of a poor woman to be hanged on the morrow. She was the angel of the prisons. By her aid all the prisons of the world became kinder and better places. There is not now a single woman in gaol who ought not to bless the name of Elizabeth Fry.

Her idea was that a person who does wrong should be handled in such a way that he does not become worse, but better. Prisons are not for punishment, but for improvement. She wanted to teach the worst person in prison that, if he wished, be could become better. Prison is a terrible punishment. To be locked up like a wild beast is a frightful indignity. But even in prisons—which are necessary—the Spirit of Christ can enter, and the most degraded criminal can learn to forget his sufferings in the love and mercy of a Saviour who understands all his difficulties.

Elizabeth Fry *proved* this, and began a great work. Our prisons are better ; but we ought to make prison a place which saves everybody who enters it. That is what Elizabeth Fry intended ; that is what you must accomplish.

THE BIRD THAT NAPOLEON SET FREE

THERE is one trivial scene in the life of Napoleon which shows us a glimpse of his humanity.

Beaten by the great Duke of Wellington, that master Englishman who "gained a hundred fights, nor ever lost an English gun," Napoleon had ridden, haggard and helpless, into Paris. Early in those terrible hours he closeted hurriedly with a friend named Gourgand, and discussed with him what could be done. Should he surrender to the English, or make his escape to America ? While the two men argued in this terrible hour of panic and suspense, a little bird flew in at the open window. The excited Gourgand caught it in his hand.

"An omen of good fortune!" he cried.

Napoleon looked at the poor, frightened bird captive in the hand of a man, and said, "Let it go free. There are enough unhappy beings in the world."

It was a touch of mercy. The mighty conqueror, who had hurled, without a tear, legions of men to destruction, could not bear in his terror to look upon the frightened bright eye of a little bird.

"Let it go free! Let it go free!"

THE DAUGHTER OF SIR THOMAS MORE

ONE of the crimes that will be remembered against King Henry VIII. as long as the world lasts is the murder of his greatest subject and the noblest Englishman of that age, Sir Thomas More. And men chiefly remember this crime, perhaps, because they were told in childhood the story of Sir Thomas More's daughter, the beautiful and heroic Margaret Roper.

Sir Thomas More was the son of a judge, Sir John More, and while his father was yet living, the son was made Lord Chancellor. So he became his father's chief. But such was the noble nature of this man, that when on his way to Court he encountered his father, he would kneel down before him and ask his blessing.

He was one of the greatest scholars of that day, and his stately house at Chelsea was always crowded with distinguished people anxious to hear his bright and wise conversation. His children and their children were ever close to him, but none was so faithful

THE FAITHFUL DAUGHTER OF SIR THOMAS MORE CHEERED THE LAST HOURS OF HER FATHER

to him, so gentle and helpful in trial, as the lovely Margaret, wife of William Roper.

And when evil times fell, and for conscience' sake Sir Thomas More was thrown into prison, it was Margaret who proved his chief comfort. His wife did not understand him.

"Why do you live in this filthy prison with rats and mice," said she, "when you might sit at the King's right side and enjoy yourself at home?"

To which the great man replied with a smile:

"I pray thee, good Mrs. Alice, tell me one thing—is not this house as near heaven as my own?"

Margaret understood him better, and cheered him in his disposition to defy the King. But her heart was near breaking. After his trial, when he had been condemned to death, this daughter broke through the soldiers surrounding him, flung her arms about his neck, and cried:

"Oh, my father!—oh, my father!" And he laid his hand on her head and blessed her.

She parted from him only to return, once more flinging her arms impulsively about him, and kissing him with such an agony of affection that even the soldiers wept. And when she got home she received a letter from her father written in charcoal:

"I never liked your manner better than when you kissed me last; for I am most pleased when daughterly love and dear charity have no leisure to look to worldly courtesy."

The head of this splendid man was set on a pole on London Bridge, but it soon vanished. No one knows how, but Margaret Roper obtained it in some way, and the news soon got whispered that she was the thief.

Then was this gracious lady summoned to attend before the King's council, and there, unaffrighted, she owned that the head was in her possession. So noble was her manner in making this declaration that no man dare punish her, and she was allowed to keep the sacred relic. It was ever with her, and when she died it was buried in her arms.

The next Golden Deeds are on page 1653.

THE GREAT THINKERS OF GREECE IN THE GOLDEN DAYS OF ATHENS

This picture of "The School of Athens," painted by Raphael on the walls of the Pope's palace in Rome, represents the great men of Greece. Coming down the steps, in the centre, are Plato and Aristotle, with their disciples. On the left are Socrates talking to Xenophon, and Alcibiades in his helmet. Underneath are Democritus and Pythagoras; on their right sits Heraclitus. On the steps, to the right, lies Diogenes, and above, to his right, Aristippus talks to Epicurus, Pyrrho, Arcesilaus, and others. Below is Archimedes, teaching geometry.

WHAT THIS STORY TELLS US

THERE were three peoples in ancient times who in one way or another did much to shape the history of the nations that lived after them. These three were the Hebrews, of whom we read in the Bible; the Romans, about whom we have read already; and the Greeks, about whom we read in these pages. Indeed, there are some people who declare that if anyone says or thinks of anything very wise or very beautiful, we shall find that there was some Greek who said or thought of the very same thing more than 2,000 years ago. Moreover, it is remarkable that nearly all of the greatest of the Greeks belonged to one city, Athens, so that, out of the eleven men about whom we have to read here, six were Athenians, and the eleven number among them not only some very great statesmen, and one of the greatest of all soldiers, but also three of the wisest men who ever lived.

THE GREAT MEN OF GREECE

CONTINUED FROM 1262

WE will begin with Solon, the Athenian. For it was he who set the State of Athens in order, so that after his time it was difficult for the rich people, or people proud of their high birth, to oppress those who were poor and humbly born. When he was a young man he travelled much; and, returning to Athens, he soon won fame by persuading his countrymen not to submit to their enemies, and by leading them successfully in battle. Then, when there was great discontent and trouble between the rich and the poor, both asked Solon to make new laws which would be fair to both, and he made them promise that they would not change his laws for ten years without his leave. And when he had made the new laws he went away, knowing that if he stayed many would ask him to change the laws again; but that after ten years they would have learnt that the laws were good, and would not wish to change them. And so it fell out.

The story is told how he showed his wisdom when he came in his travels to the Court of Crœsus, the King of Lydia, who was one of the mightiest kings, and the richest in the world. Crœsus, having shown Solon his great riches, asked him who he thought was the happiest of men, counting that he would answer, "Crœsus, the King." But Solon said, "Tillus, the Athenian; for he lived honourably, and begat noble sons and fair daughters; and at the last he fell in battle gloriously, having given victory to his country." Then, Crœsus asking, "And the next?" Solon made answer, "Cleobis and Biton, whose mother prayed the gods to grant the best of all gifts to her sons for the utter love and tenderness they had shown to her; and on the morrow the twain were found dead. For he is happiest who dies most happily; and no man may be counted happy until he is dead." But of Solon's own dying we know only that he was full of years and honour.

But we may be assured that he would have accounted happy Leonidas, the Spartan, who comes into our talk for one most glorious deed. For when the King of Persia made war upon the Greeks, and marched against them, as men say, with the greatest army that ever was seen, he must make his way into Greece through a mountain pass which is called Thermopylæ. And here, because the way is so narrow that but four men could march into it together, the Greeks could have held him at bay with an advance guard of but a few thousand men, till all their forces should be gathered;

and at the head of these was set the Spartan king, Leonidas.

But when it was found, after the Greeks had already beaten back an attack, that there was another way, so that a Persian host might pass behind them and attack in great numbers, then Leonidas sent back most of his army, seeing that those who abode at Thermopylæ must be overwhelmed.

HOW LEONIDAS AND HIS HEROES DROVE BACK THE PERSIANS AT THERMOPYLÆ

But he, with three hundred men of Sparta and seven hundred from Thespiæ, resolved that they would remain and die at their post. And when one said that if they went out to battle against the Persians the very sun would be hidden from them by the flights of the Persian arrows, answer was made, "The better, for so we shall fight in the shade."

Then Leonidas would wait no longer behind the ramparts that had been built; but he and his men, having made ready as if they were going to some festival, marched out in battle array and charged across the open upon the myriads of the Persians, and slew many thousands of them before the last of their own number had fallen. So that the fame of Leonidas and his three hundred Spartans and the seven hundred Thespians has rung across the ages, like a trumpet-call, to deeds of valour from that day until now.

Yet it was not Leonidas, the Spartan, who overthrew the Persians, but Themistocles, the Athenian; for the numbers that Leonidas had slain at Thermopylæ was but a tiny part of the Persian king's army which set forth against the Greeks. Now, they would have had a hard task to fight their way across the narrow isthmus of Corinth into the south of Greece, but Athens lay an easy prey for them.

THEMISTOCLES MAKES ATHENS STRONG BY SEA AND WINS A GREAT BATTLE

This very clever Athenian, Themistocles, however, had seen that his city might become very powerful if she had a great fleet; and by his counsel the Athenians had built many ships, and had become the most skilful sailors of all the Greeks. And now the men of Athens went to their ships, having set their women and children on an island hard by; and it was now the counsel of Themistocles that they should do battle with the Persians by sea; for if they beat them on the sea, then the Persians, being so far from their own country, would find themselves in danger by land also. The Greeks of the south, which is called Peloponnesus, thinking their own land secure, were not eager to fight by sea, but Themistocles was so sure of winning, that when some of the Greeks talked of sailing away, he sent a message to the Persians bidding them send ships and block up the way of escape, pretending that he had goodwill toward them. So when the other Greeks found there was no other way, they made ready for a sea fight.

Then was fought the battle of Salamis, which was won chiefly by the skill and valour of the Athenian fleet, led by Themistocles. And the battle of Salamis really decided the war, though afterwards there was another great battle by land, in which also the Greeks were victorious. But in later days Themistocles quarrelled with the Athenians, and betook himself to the King of Persia, making pretence of friendliness; and he died in Persia, having taken poison, men said, to kill himself.

ATHENS BECOMES POWERFUL AND BEAUTIFUL UNDER THE RULE OF PERICLES

After Themistocles had gone from Athens, the guidance of the affairs of the city came, before very long, into the hands of a great statesman named Pericles. Now he, like Themistocles, saw that the greatness and the power of Athens depended on the strength of her fleet; and he made it his aim to set Athens at the head of the sea-going states, so that all should be, not exactly her subjects, but united in a league of which she was the acknowledged chief.

Under his guidance Athens increased not in power only, but in wealth and beauty and knowledge. For the greatest of sculptors, Phidias, and great poets such as Sophocles lived at Athens, and it became the most beautiful city in the world; and the wisest of the men and women of the time were the friends of Pericles. There are many people who think that of all Greek statesmen he was the greatest, and certainly there was none who did more for the good of his own city of Athens. And yet not Pericles nor any other thought of trying to unite the Greeks into one great

THE CONQUESTS OF ALEXANDER THE GREAT

Alexander, the son of King Philip of Macedon, succeeded to his father's kingdom when quite a young man. He led a small army of the Greeks against the vast host of Persians under Darius, and won three great victories. This picture shows the final victory at Arbela over an army which is said to have numbered a million men.

After the battle of Arbela, Alexander entered Babylon, the most famous city of the Old World, and met with no resistance. He was always very considerate of the religion of the nation he conquered, and on entering Babylon, as seen in this picture, he offered the customary sacrifices, and commanded the temple of Bel to be rebuilt.

nation, which could act in harmony; but all the cities remained separate, so that there were endless strifes and rivalries between city and city.

Of all these rivalries the greatest was between Athens and Sparta. For Sparta thought to set herself over all the Greeks; but Athens, with Pericles guiding her, would not suffer Sparta to rule after this fashion, and gave aid to other cities which would not obey the Spartans, and there was war, so that in the hour of the death of Pericles, and for some while after, it seemed as though Athens might become the leader of all the Greeks. But after him there was none who could see so clearly and rule so wisely as he; and Athens was worsted, through striving to make a wider empire than she was fit for.

Thus the Spartans won the chief power, so that nearly all the states of Greece had to bow to their will, though they were not altogether subject to her. And then it was not Athens, but a neighbour state called Thebes, which set Sparta at defiance, and for a short time became the most powerful of the Greek states.

THE TWO FRIENDS WHO SAVED GREECE FROM THE TYRANNY OF SPARTA

This was due mainly to two men —Pelopidas and Epaminondas—who were very dear friends; but most of all to Epaminondas. Pelopidas was a man of great wealth, very generous, a very daring soldier, and well beloved. But Epaminondas was poor.

Yet, of the two, Epaminondas did more; for, in the first place, he did not care about his own greatness at all; and, in the second place, he did not seek to make Thebes great only for the sake of Thebes, but that his city might deserve well of all the Greeks. And he trained himself in body and mind, so that there was nothing he could not do well, whether to persuade men by speech, or to fight valiantly himself, or to train an army and lead it in war. And when the Thebans chose him, with his friend Pelopidas, to lead them, he gave defiance to Sparta, whose soldiers were thought to be invincible, and by his skill as a general he overthrew them at the battle of Leuctra, though their numbers were the greater. And the Thebans won freedom for other states from the tyranny of Sparta. But at last, when Epaminondas was warring against Sparta, there was a great battle at Martinea, and the Spartans were routed. In the hour of victory Epaminondas received a mortal wound, and, in their grief at the loss of their loved chief, his men had no care to pursue the foe; nor was any left after him to carry on his work as a statesman or even as a soldier, so that the strifes and rivalries of the Greek states continued.

THE COMING OF KING PHILIP OF MACEDON AND HOW HE TRIED TO RULE GREECE

While the Greek states continued to waste themselves in their rivalries, there was being built up northward, in Macedon, a powerful kingdom, which was Greek, too, although it had been less civilised than the rest of Greece. The building up of the power of Macedon was for the most part the work of the crafty King Philip, and soon men began to see that Philip meant to make Macedon the head of all the Greek peoples. Moreover, to some it seemed that Philip would not be content with that, but intended really to make himself master of the whole land. Therefore the great orator Demosthenes tried hard to make the people of Athens oppose the plans of Philip.

Now, this Demosthenes was one of the most wonderful orators in the world, so that to this day people study his speeches in order to learn how to speak so as to persuade multitudes of people. It is said that he made himself so good a speaker that he could speak quite distinctly with pebbles in his mouth, and could recite poetry aloud though he was running uphill; and he studied very hard so as to learn the best possible way of expressing whatever he wished to say.

HOW DEMOSTHENES THE ORATOR WAS DRIVEN INTO EXILE TO DIE

Now, Demosthenes could not make the Athenians strong enough to resist Philip; still, he spent the best part of his life in trying to encourage the Athenians and to persuade other Greek states to help them. The speeches which he made against Philip are called the "Philippic Orations," and so when other people make speeches of the same kind they are called "Philippics." After Philip was dead, and when his son Alexander the Great was in Asia, the Regent of Macedon caused

THE LAST HOURS OF TWO GREAT MEN

Socrates was the man of thought, one of the wisest teachers among the Greeks. He was a very ugly old man, but won many friends and followers. He taught that the greatest thing in the world was knowledge, and that the most important kind of knowledge was for a man to know himself. The Athenians, however, did not like his influence over the young men, so they condemned him to poison himself by drinking hemlock, as seen here.

Alexander the Great was the man of action and energy. During ten years he led a mighty army and conquered Persia, Egypt, and Phœnicia, and even marched on to India, where he defeated a brave king named Porus. No king had ever before ruled over so vast an empire as Alexander, who is said to have sighed for other worlds to conquer. When only thirty-three years old, however, he died of fever, and his empire fell to pieces.

Demosthenes to be sent away from Athens; but afterwards the Athenians revolted and Demosthenes came back.

The Macedonians had him driven out again, but when his enemies went in pursuit of him he knew that he would be put to death, and so he chose rather to die by taking poison himself.

ALEXANDER THE GREAT, WHO BECAME CONQUEROR OF ALL THE KNOWN WORLD

During the last twelve years of the life of Demosthenes, Alexander the Great, the son of Philip of Macedon, made himself one of the most famous conquerors of all time, though he was only thirty-three years old when he died. For he had already learned war-like skill from Philip; and Philip, when he had made Macedon the chief of the Greek states, had already planned that the Greeks should send an army to make war on the great kingdom or empire of Persia, although the Persian king's dominions reached all the way from the borders of India to the Mediterranean Sea, and even Egypt belonged to him; and the Greeks could only send a very small army against his great one.

Still, when Alexander was only twenty-three, he led his army into Asia Minor, which was the western part of the dominions of King Darius of Persia, and there he routed the Persians at the battle of the Granicus. Then Darius met him with another great army at Issus, and was routed again. After that, Alexander decided first to conquer the western lands completely, and he overthrew the cities of Phœnicia, which is just on the north of the Holy Land, and then Egypt made submission. Then he marched again against Darius, and overthrew him utterly at Arbela; and soon after that Darius was murdered.

DEATH CONQUERS THE CONQUEROR AND HIS SOLDIERS BREAK UP HIS EMPIRE

But when Alexander had conquered the whole Persian Empire he was still not satisfied, but marched on into India, and there he overthrew a brave Indian king who was called Porus; so that no king in the world before Alexander had ever been the lord of so vast an empire. All this Alexander did in ten years. But he had no chance of doing more, for very soon after he died of a fever, and the generals of his army divided the great empire up among themselves.

Between the time of Pericles and the time of Alexander there lived three of the very wisest among all men. The first was Socrates, who was born just at the time when Pericles was becoming well known in Athens; and the next was Plato; and the third was Aristotle. They were all philosophers, which means, in the first place, lovers of wisdom; and that is a name given to people who care more about knowing what is true and good than about worldly success, and try to help other people how to think, which is a very much more difficult thing than some people suppose.

PLATO AND SOCRATES, THE LEADERS OF THE WISE MEN OF ATHENS

Now, both Plato and Aristotle wrote a great many books; but Socrates wrote no books at all. However, we know a good deal about him; because, for one thing, a man named Xenophon, who admired him very much, wrote a book about him; and, for another thing, there was a great dramatist at Athens who used to laugh at him, and bring him into his plays for other people to laugh at; and, besides that, Plato has shown us still more clearly what kind of man he was; for Plato wrote a great many of his books in the form of "dialogues," or conversations, in which Socrates is supposed to be talking to other people.

And though we may be pretty sure that, when Plato wanted to teach people something, he often pretended that it was Socrates from whom he had learned it, though he had really thought of it himself, still, we know from that the kind of way in which Socrates must have been in the habit of talking, and that he was not only wise and good, but witty as well, and that his friends loved him deeply.

It was a curious thing that the Greeks, who were usually good-looking, found it difficult to believe that anyone could be both wise and ugly; but Socrates was quite ugly. Still, he was strong and sturdy, and when he had to go to fight in the Athenian armies he was a good soldier. But there was one very odd thing about him, which was that now and then he would suddenly fall into a trance, and stop quite still, unconscious of anything that was going on about him; and then the trance

TWO OF THE WISEST MEN OF GREECE

Plato and Aristotle, whom we see here walking down the steps of the famous School of Athens, were the most famous philosophers of the Old World. Plato, a disciple of Socrates, is pointing upwards to heaven, indicating that his teaching treated more of the poetical and spiritual, while Aristotle, the pupil of Plato, is pointing to the earth, indicating that his teaching dealt with Nature and the understanding of the world. The word on the book in Plato's hand means "I reverence," and that on Aristotle's means "Ethics" or "Morals," about which he taught. Both philosophers used to lecture to their followers in a school outside Athens, and Raphael, one of the world's great painters, has painted them here coming together from this school.

would come to an end, and he would go on just as if nothing had happened.

Now, Socrates thought that the most important thing in the world to get is knowledge and the most important kind of knowledge is to know yourself, because the better you know yourself, the more you see how little you really know, and how much of what you think you know may be quite wrong.

How Socrates was condemned to die for making people think

And by always asking people why they thought this or that, he set them thinking and trying to see the reason of things. But people who had no good reason for what they thought got annoyed, and when they found young men beginning to say that things were wrong which they had been in the habit of calling right, they said that Socrates was corrupting the young Athenians.

So Socrates was brought before the judges for misleading people—just as at the time of the Reformation people used to be tried and punished for teaching what was called heresy; and he was condemned to death, and was made to drink hemlock. But his friends were allowed to see him when he took the poison; and all the time he was dying he talked cheerfully to them, having no fear of death; and his talk was chiefly intended to help them to feel sure, as he was himself, that we have souls which are immortal, and do not die when our bodies die.

Plato, the pupil of Socrates, and Aristotle, the pupil of Plato

Plato was one of the young men who were disciples of Socrates, and he went on teaching people afterwards what he had learned from Socrates, and a good deal more which he saw must be true if what he had learned from Socrates were true. The books that he wrote are very wise, but are written in such a delightful way that anyone who can understand them loves them—though sometimes they are very difficult indeed to understand, because the things he tried to explain still puzzle very wise people.

After Plato came Aristotle, who was a pupil of Plato's, tutor to Alexander the Great. He, too, wrote many books; but he did not look at things quite in the same way as Plato, and because people who love knowledge for its own sake are sometimes inclined to look at things in Plato's way and sometimes in Aristotle's way—but none can help doing it in the same sort of way as one or the other of them—it is sometimes said that all philosophers are either Platonists or Aristotelians, even though they may not think so themselves. For Plato thought in the way that poets think, and Aristotle thought in the way that men of science think.

It is a curious thing that Aristotle did so much to teach men how to set about finding out the way in which Nature works, that a time came—hundreds of years later—when people began to think it was really wicked to say that Aristotle could have ever made a mistake. And, on the other hand, many people have found that, though they were Christians, they understood their own religion all the better when they had studied the teachings of Plato, though he died more than three hundred years before Jesus was born.

The last of the men with the ancient spirit of Greece

After those days the Greek states seemed to lose their power of giving the world men of the greatest kind; they seemed to be depressed by the leadership of Macedon; and a long time afterwards they were swallowed up in the great Roman Empire. But there is one man who lived not very long before that happened whose name deserves to be remembered. This was Philopœmen, who was afterwards called "the last of the Greeks," which meant that he was the last of the men of importance who showed the old Greek spirit of fearless courage and high-minded patriotism. He tried to persuade the different cities of Greece that they ought to think of each other not as rivals, but as one nation.

Philopœmen was famous for daring and skilful leadership in time of war, and was honest and free from self-seeking. Once, when he arrived at an inn, the inn-keeper's wife thought that he was Philopœmen's servant, and set him to lay the table and wash the dishes, until her husband came in and recognised him. In the end he was thrown from his horse, taken prisoner, cast into a dungeon underground, and poisoned; and in this way died "the last of the Greeks."

The next stories of men and women begin on page 1467.

GULLIVER'S TRAVELS

A FEW years after "Robinson Crusoe" was published, one of the greatest satirical stories in our language appeared. This was "Travels into Several Remote Nations of the World," the author of which called himself "Lemuel Gulliver." The first part appeared in 1726. It was written just like a book of real travel, but its purpose was to satirise the England of that time, to laugh at its follies. The story is extraordinary, and people liked it because it was so unusual. It has been a favourite with young folk for many generations, as the adventures it describes are so quaintly impossible that they are interesting quite apart from their inner meaning. The author was the Rev. Jonathan Swift, Dean of St. Patrick's, Dublin. In our description we shall use the original words as often as possible, to show the style of the writing. Lilliput is meant for England, and the war with Blefuscu about the eggs is meant to ridicule the stupid reasons nations had for making war, on provocation of the slighest character.

GULLIVER IN LILLIPUT

How He Became a Captive of the Little People

CONTINUED FROM 1238

LEMUEL GULLIVER tells us that his father had a small estate in Nottinghamshire, and that he was the third of five sons. He was bound apprentice to an eminent surgeon in London, and his father now and then sending him small sums of money, he laid them out in learning navigation, as he believed that some day he would travel, and this knowledge would be useful to him. He did become surgeon successively in two ships, and made several voyages to the East and West Indies. His hours of leisure on these voyages were spent in reading the best authors; and, when he was ashore, in observing the manners of the people, as well as learning their language.

Gulliver afterwards accepted an offer from Captain Prichard, master of the Antelope, who was making a voyage to the South Sea, and set sail from Bristol, May 4th, 1699. They were driven by a storm to the north-west of Van Diemen's Land, where they were tossed on a rock. Six of the crew, of whom Gulliver was one, launched a lifeboat and got into it, but in about half an hour it was upset. What became of his companions he did not know, but he swam as fortune directed him; and when he was almost gone he found himself within his depth, and so reached the shore. We may let Gulliver tell his own story as nearly as possible in the original words whenever we can; and so we shall hear how he fared after he succeeded in getting safe, though exhausted, to the land.

"I lay down on the grass and slept. When I awaked I was unable to stir. My arms and legs were fastened to the ground; my hair was tied down in the same manner. I felt several ligatures and bindings across my body. I could only look upwards. The sun began to grow hot, and the light offended my eyes. I heard a confused noise about me. In a little while I felt something alive moving on my left leg, and, advancing gently forward over my breast, it came almost up to my chin. Bending my eyes downwards as much as I could, I perceived it to be a human creature not six inches high, with a bow and arrow in his hands, and a quiver at his back.

"In the meantime, I felt at least forty more of the same kind following the first. I roared so loudly that they all ran back in a fright; and some of them (I was afterwards told) were hurt with the falls they got by leaping from my sides upon the ground. However, they soon returned. I lay

all this while in great uneasiness. At length, struggling to get loose, I broke the strings, and wrenched out the pegs that fastened my left arm to the ground. There was a great shout. In an instant I felt about a hundred arrows discharged on my left hand, which pricked me like so many needles. Besides, they shot another flight into the air, as we do bombs in Europe, some of which fell on my face, which I immediately covered with my left hand. I then thought it the most prudent method to lie still.

"When the people observed that I was quiet, they discharged no more arrows; but by the noise I heard I knew their numbers had increased; and about four yards from me, over against my right ear, I heard a knocking for above an hour. Turning my head as well as the pegs and strings would permit me, I saw a stage erected, about a foot and a half from the ground, capable of holding four of the inhabitants, with two or three ladders to mount it, whence one of them, who seemed to be a person of quality, made me a long speech, whereof I understood not one syllable.

How the Lilliputians Fed the Man-Mountain

"But, before he began, he cried out three times, whereupon about fifty of the inhabitants cut the strings that fastened the left side of my head, which gave me the liberty of turning it to the right, and of observing the person and gesture of him that was to speak. He appeared to be of middle age, and taller than any of the other three who attended him. He acted every part as an orator, and I could observe many periods of threatenings, and others of promises, pity, and kindness.

"I answered in a few words, but in the most submissive manner, lifting up my left hand, and both my eyes to the sun, as calling him for a witness; and, being almost famished with hunger, I put my finger frequently on my mouth to signify that I wanted food. The Hurgo (for so they call a great lord, as I afterwards learnt) understood me very well. He descended from the stage, and commanded that several ladders should be applied to my sides, on which above an hundred of the inhabitants mounted and walked towards my mouth, laden with baskets full of meat, which had been provided and sent thither by the King's orders, upon the first intelligence he received of me.

"I observed there was the flesh of several animals, but could not distinguish them by the taste. There were shoulders, legs, and loins, shaped like those of mutton, and very well dressed, but smaller than the wings of a lark.

Gulliver Drinks at One Draught No Less than 108 Lilliputian Gallons!

"I ate them by two or three at a mouthful, and took three loaves at a time, about the bigness of musket bullets. They supplied me as fast as they could, showing a thousand marks of wonder and astonishment at my bulk and appetite. I then made another sign that I wanted drink.

"They found by my eating that a small quantity would not suffice me; and, being a most ingenious people, they slung up with great dexterity one of their largest hogsheads, then rolled it towards my hand, and beat out the top. I drank it off at a draught, which I might well do, for it did not hold half a pint (though 108 Lilliputian gallons), and tasted like a small wine of Burgundy, but much more delicious. They brought me a second hogshead, which I drank in the same manner, and made signs for more but they had none to give me."

After this, Gulliver tells us that he went to sleep, and slept for about eight hours, the Lilliputians having dabbed his face and hands with an ointment which removed all smart of their arrows.

Fifteen Hundred Horses Draw the Man-Mountain to the Capital

By the Emperor's orders the physicians had mingled a sleeping potion in the wine given to Gulliver, who supplies an entertaining description of the way in which he was conveyed to the Lilliputian capital on an engine contrived by a small army of engineers and carpenters, and drawn by fifteen hundred of the Emperor's largest horses. There was outside the capital an ancient temple, the largest in the kingdom. The great gate was about four feet high and two feet wide, and through this he managed to creep. To the portal of this temple he was for a time chained by his left leg.

Some hundred thousand of the inhabitants came out to view him, and

GULLIVER BOUND AND GULLIVER FREE

Gulliver had been driven ashore from a wreck on to the coast of a strange land, which turned out to be Lilliput. As he lay asleep, the Lilliputians, none of whom was bigger than one of Gulliver's fingers, found him and secured him to the earth with numerous ropes and pegs. But when he awoke and began to wrench himself free, he shook many of the little people off him like flies, and they had to attack him with whole regiments of archers to make him lie quiet before they conveyed him, with infinite labour, to the capital of Lilliput.

It was no easy matter for Gulliver to accept the king's invitation to inspect the royal palace, as he could not step over the houses and walls without knocking some of them down. But at length, by making a stool out of some of the trees he found growing in the royal park, he was able to step across without damaging the buildings, though in order to look into the rooms in the upper storeys he had to lie down in the great square of the palace. The queen came out on her balcony, and, smiling very graciously upon him, gave him her hand to kiss.

his guards numbered ten thousand. He continued to lie on the ground of the temple for about a fortnight, when the Emperor caused a bed to be made for him, six hundred beds of the common measure being used for this purpose. An Imperial proclamation was issued, obliging all the villages nine hundred yards round the city to provide the prisoner with food and drink, payment for which was to be made from the Imperial treasury. The allowance stipulated for was sufficient for the support of one thousand seven hundred and twenty-eight Lilliputians.

An establishment of six hundred domestics was also arranged for him. Further, three hundred tailors were appointed to make him a suit of clothes after the fashion of the country. The land appeared, he says, like a continued garden, and the enclosed fields, which were generally forty feet square, resembled so many beds of flowers.

Proclamations were issued directing all who had beheld the Man-Mountain, as he was called in the language of the country, to return home and not presume again to come within fifty yards of his house without licence from the Court, "whereby the Secretaries of State got considerable fees."

GULLIVER AT THE ROYAL PALACE OF LILLIPUT

One day the Emperor desired Gulliver to stand up like the Colossus, with his legs apart, and marched his troops under him. The troops so engaged numbered three thousand foot and a thousand horse.

At last, upon certain conditions, Gulliver was given his liberty, and was allowed to see the capital. The people had notice by proclamation of his design to visit the town, which was surrounded by a wall two feet and a half high, and at least eleven inches broad, and flanked with strong towers ten feet apart.

"I stepped over the great western gate (he tells us), and passed very gently, and sideling, through the two principal streets, only in my short waistcoat, for fear of damaging the roofs and eaves with the skirts of my coat. The garret windows and tops of houses were so crowded with spectators that I thought in all my travels I had not seen a more populous place. The two great streets are five feet wide. The lanes and alleys, which I could not enter, are from twelve to eighteen inches. The town is capable of holding five hundred thousand souls. The houses are from three to five storeys, the shops and markets well provided. The Emperor's palace is in the centre of the city. It is enclosed by a wall two feet high, and twenty feet distant from the buildings.

GULLIVER CANNOT WALK IN THE PALACE FOR FEAR OF KNOCKING IT DOWN

"The outward court is a square of forty feet, and includes two other courts; in the inmost are the Royal apartments. The buildings of the outer were at least five feet high, and it was impossible for me to stride over them without infinite damage to the pile, though the walls were strongly built of hewn stone, and four inches thick.

"At the same time the Emperor had a great desire that I should see the magnificence of his palace; but this I was not able to do until three days after, which I spent in cutting down with my knife some of the largest trees in the Royal park about a hundred yards distant from the city. Of these trees I made two stools, each about three feet high, and strong enough to bear my weight.

"The people having received notice a second time, I went again through the city to the palace, with my two stools in my hands. When I came to the side of the outer court I stood upon one stool, and took the other in my hand. This I lifted over the roof, and gently set it down on the space between the first and second court, which was eight feet wide. I then stepped over the buildings very conveniently from one stool to the other, and drew up the first after me with a hooked stick.

THE EMPRESS OF LILLIPUT IS VERY GRACIOUS TO GULLIVER

"By this contrivance I got into the inmost court, and, lying down upon my side, I applied my face to the windows of the middle storeys, which were left open on purpose, and discovered the most splendid apartments that can be imagined. There I saw the Empress and the young princes in their several lodgings, with their chief attendants about them. Her Imperial Majesty was pleased to smile very graciously upon me, and gave me out of the window her hand to kiss."

THE ARMY OF LILLIPUT MARCHES PAST

One of the most curious incidents in Gulliver's sojourn among the Lilliputians was when the Emperor of Lilliput had the happy idea of making Gulliver stand up like the great Colossus statue with his legs apart, and marched the royal army of 300,000 foot and 1,000 horse between the gigantic legs of the captive Man-Mountain.

But a little while after Gulliver found that there were two struggling parties in the Empire of Lilliput, under the names of Tramecksan and Slamecksan, from the high and low heels on their shoes, by which they distinguished themselves. In addition, there was a threat of invasion from the Island of Blefuscu, the other great empire of the universe. The long-standing trouble between these two mighty empires arose out of the following incident.

The grandfather of the Emperor of Lilliput, when a boy, as he was going to eat an egg, broke it at the larger end, according to the ancient practice, and cut one of his fingers. Whereupon the Emperor, his father, published an edict commanding all his subjects, upon great penalties, to break the smaller end of their eggs. This led to rebellion and civil discord, which were fomented and encouraged by the Emperor of Blefuscu, at whose court the Big-Endian exiles found much favour.

Gulliver, having expressed his readiness to defend the person and state of the Emperor of Lilliput against all invaders, captured the fleet of Blefuscu by the simple plan of swimming out to meet it and fastening cords to each boat, wherewith, after cutting their cables, he, "with great ease drew fifty of the enemy's largest men of war" into the Royal port of Lilliput. They attacked him with their arrows all the while, of course, but he did not mind that, as he wore a pair of spectacles to protect his eyes.

But because Gulliver protested against the Emperor's revengeful design for reducing the whole of the rival empire into a province and destroying the Big-Endian exiles, he fell into disfavour.

Being informed of a design to accuse him of high treason, he made his escape to Blefuscu, whence, by a lucky accident, he secured the means of reaching his own country again, and returned to England on April 13th, 1702.

GULLIVER IN THE LAND OF BROBDINGNAG

And What Befell Him Among the Giants

Like Robinson Crusoe, Gulliver had a passion for travel. On the 20th of June following his return from Lilliput, he again sailed, this time for Surat, in the Adventure. About a year later this vessel was driven in an eastward direction, past the Molucca Islands. The ship being in need of water, the captain sent a party ashore in the long-boat, Gulliver being of the number. When they came to land, Gulliver wandered about a mile away from the sea.

Returning to the creek, he saw the men already in the boat, and rowing for life to the ship. He was about to holloa after them, when he observed a huge creature walking after them in the sea. But the men having the start, escaped. "This," he says, "I was afterwards told, for I durst not stay to see the issue of that adventure, but ran as fast as I could the way I first went, and then climbed up a steep hill, which gave me some prospect of the country."

He found it fully cultivated; but what first surprised him was the length of the grass, which in those grounds that seemed to be kept for hay was about twenty feet high. He came upon a high road, so he imagined, though it served to the inhabitants only as a footpath through a field of barley! Here he walked for some time, but could see little on either side, it being now near harvest, and the corn rising at least forty feet.

"I was an hour (he goes on to say) walking to the end of this field, which was fenced up with a hedge of at least 120 feet high, and the trees so lofty that I could make no computation of their altitude.

"I was endeavouring to find some gap in the hedge, when I discovered one of the inhabitants in the next field advancing towards the stile, of the same size with him whom I saw in the sea pursuing our boat. He appeared as tall as an ordinary spire-steeple, and took about ten yards at every stride. I was struck with the utmost fear and astonishment, and ran to hide myself in the corn, looking back into the next field. I heard him call in a voice many degrees louder than a speaking-trumpet; but the noise was so high in the air that at first I certainly thought it was thunder. Whereupon seven monsters like himself came towards him with reaping-hooks in their hands, each hook about the largeness of six scythes."

Whilst Gulliver was lamenting his folly and wilfulness in attempting a second voyage against the advice of all his friends and relations, and had hidden in a ridge for fear, one of the reapers approached so near as to make him apprehend that with the next step he should be squashed to death under foot or cut in two with the reaping-hook. He screamed as loudly as he could.

THE TREMENDOUS GIANT WHO FOUND GULLIVER AMONG THE CORN

"Whereupon (says he), the huge creature trod short, and, looking round about him for some time, at last espied me as I lay on the ground. He considered awhile with the caution of one who endeavours to lay hold on a small, dangerous animal in such a manner that it shall not be able either to scratch or bite him. At length he ventured to take me up behind by the middle between his forefinger and thumb, and brought me within three yards of his eyes, that he might behold my shape more perfectly.

"I guessed his meaning, and my good fortune gave me so much presence of mind that I resolved not to struggle in the least, as he held me in the air about sixty feet from the ground, for fear I should slip through his fingers. All I ventured was to raise my eyes towards the sun, and place my hands together in a supplicating posture, and to speak some words in an humble, melancholy tone, suitable to the condition I then was in. For I apprehended every moment that he would dash me against the ground. But my good star would have it that he appeared pleased with my voice and gestures, and began to look upon me as a curiosity, much wondering to hear me pronounce articulate words, although he could not understand them.

GULLIVER IS EXHIBITED AS A CURIOSITY IN BROBDINGNAG

"In the meantime I was not able to forbear groaning and shedding tears, and turning my head towards my sides, letting him know, as well as I could, how cruelly I was hurt by the pressure of his thumb and finger. He seemed to apprehend my meaning, for, lifting up the lappet of his coat, he put me gently into it, and immediately ran along with me to his master, who was a substantial farmer, and the same person I had first seen in the field."

Gulliver was received well in the farmer's family, and made a pet of by the farmer's daughter. Then the farmer was advised to exhibit him for money. Finally, he was sold to the Queen of the land, and had much discourse with the King, when he had mastered the language of the country. A sort of box was made for him by an ingenious carpenter, and this was kept in the palace. All this time the farmer's daughter had charge of him.

After going through many adventures, he was in his box one day when it was caught up by a great bird, and carried out to sea, where it fell in the water. The box was seen by the captain of a ship. Thus it was that Gulliver was released and returned to England in June, 1706.

But here we see the consequences of having grown familiar with people and things totally different from our own countrymen and their ways, for on his way home the littleness of the houses, the trees, the cattle, and the people made him begin to think himself in Lilliput!

HOW GULLIVER FELT WHEN HE GOT HOME AFTER HIS ADVENTURES

"I was afraid of trampling on every traveller I met (he confesses), and often called aloud to have them stand out of the way, so that I had like to have gotten one or two broken heads for my impertinence. When I came to my own house, one of the servants opening the door, I bent down to go in—like a goose under a gate—for fear of striking my head. My wife ran out to embrace me, but I stooped lower than her knees, thinking she could otherwise never reach my mouth. In short, I behaved myself so unaccountably that they all concluded that I had lost my wits. In a little time, I and my family and friends came to a right understanding; but my wife protested that I should never go to sea any more, although my evil destiny so ordered that she had not power to hinder me."

Gulliver in his later travels went to Laputa, a flying island inhabited by philosophers and astronomers, and to the country of the Houyhnhnms, in which horses were the representatives of civilisation, and men, under the name of Yahoos, were degraded beings of the lowest type.

The next stories of books begin on 1493.

THE FROG THAT HELPED THE PRINCESS

THE FROG DIVES DOWN INTO THE WATER AND RESCUES THE PRINCESS'S BALL

THE PRINCESS CARRIED THE FROG TO BED & FOUND TWO LITTLE GOBLINS ON THE PILLOW

THE PRINCESS'S GOLDEN BALL

The Story of the Frog that Became a Prince

CONTINUED FROM 1192

ONE fine evening a young princess went into a wood, and sat down by the side of a cool spring of water. She had a golden ball in her hand, which was her favourite plaything, and she amused herself with tossing it into the air and catching it again as it fell.

After a time she threw it up so high that when she stretched out her hand to catch it the ball bounded away and rolled along upon the ground, till at last it fell into the spring. The princess looked into the spring after her ball, but it was very deep, so deep that she could not see the bottom of it. Then she began to lament her loss, and said:

Alas! if I could only get my ball again, I would give all my fine clothes and jewels, and everything that I have in the world."

Whilst she was speaking a frog put its head out of the water and said:

"Princess, why do you weep so bitterly?"

"Alas!" she said, "what can you do for me, you nasty frog? My golden ball has fallen into the spring."

The frog said:

"I do not want your pearls and jewels and fine clothes; but if you will love me and let me live with you, and eat from your little golden plate, I will bring you your ball again."

"What nonsense this silly frog is talking!" thought the princess. "He can never get out of the well. However, he may be able to get my ball for me, and therefore I will promise him what he asks." So she said to the frog. "Well, if you will bring me my ball, I promise to do all you require."

Then the frog put his head down, and dived deep under the water; and after a little while he came up again with the ball in his mouth, and threw it on the ground.

As soon as the young princess saw her ball, she ran to pick it up, and was so overjoyed to have it in her hand again that she hardly thanked the frog, but ran home with it as fast as she could. The frog called after her:

"Stay, princess, and take me with you as you promised."

But she did not stop to hear a word.

The next day, just as the princess had sat down to dinner, she heard a strange noise, tap-tap, as if somebody was coming up the marble staircase; and very soon afterwards something knocked gently at the door, and said:

"Open the door, my princess dear,
Open the door to thy true love here!
And mind the words that we two have said
By the fountain cool in the green-wood shade."

Then the princess ran to the door and opened it, and there she saw the frog, whom she had quite forgotten. She was terribly frightened, and, shutting the door as fast as she could, came back to her seat. The king, her father, asked her what had frightened her.

"There is a nasty frog," said she, "at the door, who lifted my ball out

of the spring this morning. I promised him that he should live with me here, thinking that he could never get out of the spring; but there he is at the door, and wants to come in!"

While she was speaking the frog knocked again at the door.

The king said to the young princess: "As you have made a promise, you must keep it; so go and let him in."

She did so, and the frog hopped into the room, and came up close to the table.

"Pray lift me upon a chair," said he to the princess, "and let me sit next to you."

As soon as she had done this, the frog said: "Put your plate closer to me, that I may eat out of it."

This she did and when he had eaten as much as he could he said: "Now I am tired. Carry me upstairs, and put me on your little bed."

The princess took him up in her hand and carried him to bed. On the pillow were two little goblins, who vanished as they appeared, so that the princess put the frog upon the pillow of her little bed, where he slept all night long. As soon as it was light he jumped up, hopped downstairs, and went out of the house.

"Now," thought the princess, "he is gone, and I shall be troubled with him no more."

But she was mistaken, for when night came again she heard the same tapping at the door; and when she opened it the frog came in and slept upon her pillow as before till the morning broke; and the third night he did the same.

But when the princess awoke on the following morning she was astonished to see, instead of the frog, a handsome prince, standing at the head of her bed, and gazing on her with the most beautiful eyes that ever were seen.

He told her that he had been enchanted by a wicked fairy, who had changed him into the form of a frog, in which he was to remain till some princess should take him out of the spring and let him sleep upon her bed for three nights.

"You," said the prince, "have broken this cruel charm, and now I have nothing to wish for but that you should go with me into my father's kingdom, where I will marry you, and love you as long as you live."

The young princess, you may be sure, was not long in giving her consent; and as they spoke a splendid carriage drove up, with eight beautiful horses decked with plumes of feathers and golden harness, and behind rode the prince's servant, the faithful Henry, who had bewailed the misfortune of his dear master so long and bitterly that his heart had well-nigh burst.

Then all set out, full of joy, for the prince's kingdom, where they arrived safely, and lived happily for many years.

GOG AND MAGOG

The Two Giant Brothers Who Watch Over London

In the gallery beneath the western window of the Guildhall of London stand two great giants, whose names are Gog and Magog.

Gog is clothed in a rude fashion, and he carries a morning star, which is a great iron ball covered with spikes, and fastened by a chain to a long pole. Magog, on the other hand, is arrayed like an ancient Roman soldier, and he carries a halbert, which is a kind of battleaxe with a spear at the top.

Gog and Magog are brothers, and the reason why they are dressed and armed in a different way is very curious.

When the ancient Britons came to England the country was peopled by a race of savage giants who lived in dark, damp caves and dressed in the skins of animals. They were very angry when the Britons settled on the banks of the Thames and began to build the city of London.

"What do these men want with houses?" said Gog. "Why don't they live in caves as we do? Let us kill them, and destroy their new city."

"No," said Magog. "Let us make friends with them, and learn how to build, and till and weave. I am sure it is more pleasant to live in a house and wear clothes than it is to live in a cave and wear skins."

But the other giants would not listen to Magog. They looked on the Britons as intruders and enemies to be driven away or killed. They attacked them and drove them into London, and then they resolved to capture the city the next morning and slay all the inhabitants.

But, on the advice of Magog, the Britons dug a wide, deep trench outside London in the night, and fixed rows and rows of sharp stakes at the bottom of the trench, and covered it with light hurdles. In the morning they went out and fought the giants, and then they pretended to be defeated, and ran back lightly across the hurdles. Their great, clumsy enemies came lumbering after them, and the hurdles gave way, and down fell all the giants into the trench upon the rows and rows of sharp stakes.

Only Gog escaped, and Magog said to him :

"Will you live with me in the Guildhall, or will you fight to the death ?"

"I will fight to the death !" cried Gog ; and, whirling his morning star, he rushed upon his brother. But Magog was armed with a halbert which the Britons had made for his use, and with this he struck Gog down and vanquished him. The Britons lifted up the wounded giant and carried him to the Guildhall, and laid him on a soft feather bed and tended him until he was healed ; and Gog was so touched by their kindness that he resolved to remain with Magog in the Guildhall and guard it from danger.

THE GIANT GOG AT THE GUILDHALL, LONDON

.THE GIANT MAGOG AT THE GUILDHALL, LONDON

Now, every Christmas night, when the clock strikes twelve, and the Guildhall is dark and silent, Gog and Magog come out for dinner, and all the rest of the year they stand in the gallery beneath the western window of the Guildhall and watch over the welfare of the people of London.

Some day you may go and see them—two fierce-looking, gigantic, dark, carved figures, one on each side of the window, so tall that you have to strain your neck to look up at them, and many people wonder how they came there.

TALES OF ENGLISH HOLIDAY PLACES

THE FOOL ON THE STOOL AT FOLKESTONE

FOLKESTONE is another of the places which we consider new, for it is only since the railway reached it that the town has become important as a place for holidays. But it was a place of note in the time of the Romans, and "Cæsar's Camp" is among the most interesting spots to-day.

It was important again at a later day, for St. Eanswith founded a great nunnery there in the seventh century. Her father was Eadbald, King of Kent, a fierce heathen king who, before he died, became a Christian. His daughter was a splendid woman, and did much for the good of the land by spreading the blessings of Christianity abroad. The building was destroyed by the Danes, but in 1885, over 1,100 years after her death, the body of St. Eanswith was found in its leaden coffin, and is now buried in the church named after her.

Once when Queen Elizabeth was passing near Folkestone, the mayor of the town went out to greet her on behalf of the people of "Folksteen," as it was called then.

"Most gracious Queen,
Welcome to Folksteen,"

he began, addressing her from a stool. But the Queen stopped him.

"Most gracious fool
Get off that stool,"

she said. That was a rude thing to say to a mayor. But in the old days they did not always treat mayors as mayors liked to be treated.

OLD SCARBOROUGH

AS everyone who goes to Scarborough is aware, there are really two towns. There is the old town, with its steep streets and stairways, its old red-tiled houses where the fishermen live as their ancestors lived hundreds of years ago. Then there is the newer and fashionable Scarborough, where fine roads and great houses make "the English Naples," as it is called, the handsomest seaside town in the North of England.

But even old Scarborough is new compared with the Scarborough whose name is forgotten. The Romans built it, but it was the hardy Norsemen who called it Scarborough. Their word for it was "Scardeburgh," which means a fortress on a rock. Led by Harald Hardrada and Tostig, two daring pirates, they attacked the town in 1066, and because they could not capture it by other means, they set fire to it. They burned all they could, and robbed and murdered right and left. Scarborough was so ruined that, when William the Conqueror had his Domesday Book written, the town was not even mentioned in it.

Later, a great castle was built, and many battles were fought in or near the town. During these dark days, George Fox, the famous Quaker, was imprisoned in the castle. He was shamefully ill-treated. One loaf of bread had to last him three weeks; he had no fire in his cell, and the roof was so leaky that he was compelled to bale out the rain which came through, like a sailor in a half-swamped boat. When the King finally learned that the good Quaker was not a rebel, he released him, but not before Fox had borne great suffering.

Scarborough's mineral springs were discovered by a lady. About a hundred years after they had been discovered, the land round about suddenly sank, the walls of the wells themselves rose up in the air, and the water disappeared. The cliff was cracked and broken in all directions. A great plot of land, with cattle feeding on it, went down seventeen yards, and parts of the broken cliff were forced into the sea. Then things settled down again. There were no more risings or fallings, and the water gradually came back to the wells.

HANGING THE MAYOR AT BODMIN

WHEN Perkin Warbeck had marched his rebel troops through Cornwall, the Mayor of Bodmin, the capital of the county, received a message from the King. The mayor was told to prepare a scaffold on which to hang a man who was supposed to have been connected with the rebellion. The scaffold was prepared.

"Is it strong enough to carry the man?" asked the King's messenger.

"Without doubt it is," was the answer.

"Then up with you, Master Mayor, for it is meant for you!" said the officer.

THE FAIRIES OF THE WILLEY HOW

THE Willey How is a great mound lying between Wold Norton and Bridlington, in Yorkshire. A farmer was returning late at night to Wold Norton, and as he passed the Willey How he heard the sound of singing and merriment. A door was open in the mound, and he walked in and saw lords and ladies sitting at a feast. A serving man poured out a cup of wine, and handed it to the farmer.

Now, if you drink fairy wine you fall into the power of the fairies, and they never allow you to come back to the world of men. The farmer knew this, and he poured the wine on the floor, and rushed out of the Willey How with the cup, and the feasters pursued him. But he got safely away, and gave the fairy cup to the King of England.

THE MERMAID OF LIZARD HEAD

ONE summer evening a Cornish farmer of the name of Lutey was walking by Lizard Head, and he heard a woman crying. On the shore he found a beautiful mermaid, with long golden hair and green eyes, crying because she had got stranded on the rocks, and could not get back to the sea. So Lutey stooped down and took the mermaid in his arms, and carried her to the water. On the way she talked to him so sweetly that he was about to dive into the sea with her, when his dog barked behind him. He turned and saw the smoke rising from the chimney of his farm, and the madness left him.

"Farewell, my sweet, for nine years," said the mermaid, as she swam away.

And nine years afterwards Lutey was out fishing in a boat, and though the weather was calm a great wave bore the mermaid over to the boat.

"My time has come," said Lutey. He plunged into the sea, swam a little way with the mermaid, and sank down with her, never to rise again.

ROBIN ROUND CAP WELL

THERE was a farmer in Holderness whose house was haunted by a little elf called Robin Round Cap. It plagued the poor farmer nearly out of his life, and one day he put all his furniture and goods on a cart, and set out to find a quieter place to live in. As he drove down the road he met a friend, who said: "Hallo! Are you moving, then?"

And before the farmer could reply a voice from the cart said "Yes."

And there was Robin Round Cap, sitting on one of the chairs. The farmer saw he would gain nothing by leaving his farm, so he returned, and got a wise man to entice Robin Round Cap into a closed-up well by his house, now called Robin Round Cap Well. There the mischievous little imp is still imprisoned.

THE SNAKE'S PARLOUR

IN the old days women used to do their washing in a very pleasant fashion. They assembled together and took their linen to a running stream, and there they scrubbed and gossiped merrily in the open air. Some women were once doing their washing in this manner by a rocky pool in the River Wye, when a girl saw a great, deadly snake glide out from the stones. On reaching one of the rocks the snake put something behind it and went away, and the girl crept up to see what it had hidden.

Finding there the poison fangs of the snake, in the shape of two little horns, she ran off with them. When the snake returned, it searched vainly behind the rock, and began to hiss and rage. It hissed louder and louder, and lashed its tail, and then, seeing nothing else to attack, it reared up and began to fight the rock. In its fury it struck the stone so hard with its head that it broke its skull and died. And the women were delighted to see that the deadly thing had killed itself, and that they could now do their washing in peace and safety.

THE GOBLIN BUILDERS OF ROCHDALE

IN the reign of William the Conqueror, Jamel the Saxon resolved to build a church to St. Chadde on the bank of the River Roach. Piles of timber and stones were brought, and the foundations were laid; but during the night the goblins, striding twenty paces at a step, carried the stones and timber to the hill-top over the river. In the morning the people set to work to bring the stones and timber back, ready to lay the foundations once more, but when the time came to begin the things had disappeared, and were again found on the hill. Thinking it useless to build by the river bank, they built the church on the hill, where it now stands, with one hundred and twenty-four steps up to it.

EARL'S DAUGHTER AND BEGGARMAN

How Guy of Warwick Went Out into the World & Came Home Again

In the early days of Britain the favourite attendant of Rohand, the Earl of Warwick, was very ill. The doctors had given him all the valuable herbs they could think of, but still he wasted and pined away.

At last he murmured very faintly:

"Felice! If Felice were brought to me, I yet might live."

The doctors, bending down, caught the words faintly, and said one to the other: "Felice? Felix? There is no such herb." And the poor boy answered: "No herb is Felice, but a flower —the fairest flower that grows."

The boy's name was Guy, and the name he murmured was the name of the great earl's beautiful daughter.

One day, when he was better and was able to move about the garden, he saw Felice approaching. She had heard that Guy was dying of love for her, and she had had a strange dream, in which Heaven declared that the life of this poor page was a precious one. So she spoke kind, strong words to him.

"Why kneel there weeping like a girl? Get up, and show if there is the making of a man in you! The swan mates not with the swallow, and I will never wed beneath me. Show yourself my peer. For I could love a brave and valiant knight before whose spear man bowed as to a king, nor would I ask his parentage; prouder far to know that my children took their nobility from a self-made nobleman. But a weeping, love-sick page! No! Show me something that you do that I can love."

Her words filled the heart of the page with a strange and glorious strength. His eyes shone, his voice rang clear. He told the beautiful girl that love for her should make him the greatest knight in the world. And Felice answered:

"I will watch and wait."

Then Guy got speedily well of his sickness, and the great Earl of Warwick, rejoicing in his favourite's recovery, dubbed him a knight, and provided him with a proud horse royally caparisoned, with rich armour, with spear and sword and shield. Thus accoutred the bright-faced boy rode away from Warwick to do great deeds, and make a name for himself. He travelled into strange lands, crossing many stormy seas, and scarcely a day passed but he was in the midst of some fierce and terrible adventure, which almost passed one's powers to believe. As the years fled away his fame increased, till the whole world seemed to be full of the deeds of Sir Guy.

After many adventures, and covered with glory, he returned to Warwick, and, presenting himself before Felice, asked her if he had yet won her love.

But Felice answered in strange voice. Yes, he had won her love; he had done great deeds; he was, in all men's eyes, the bravest knight in Christendom; yet would she not marry him. And this was her reason. Marriage would put an end to his glory. He was too young yet to turn away from joustings and tournaments; he must seek glory in his youth, and only when his arms began to weaken take his ease in the idleness of a lady's love. Glory, glory! More and ever more glory!

So Guy rode away once more, and once again the earth rang with his deeds. He defended the weak; he punished tyrants; he overthrew the cruel. Then he returned again, and this time Felice yielded to him, and the most beautiful maiden in Britain was married to the most valiant knight in Christendom.

But now a strange thing happened.

They had been married, this happy pair, forty days. It seemed as if for ever after life must be to them one long and beautiful summer festival of love and happiness. But it chanced that Sir Guy, sitting one sunset at a window in his tower, began to meditate upon his past life in foreign lands. He had killed many men; he had taken many kingdoms; he had laid waste many lands. Why? Why had he fought and killed and striven? Why? *For a woman's love!* The thought shocked him. All his life he had been seeking earthly glory for the sake of a woman's love. Not once, not once in all his crowded life, had he done a single deed purely for God.

He rose up, determined to serve his God. Felice clung to him with tears. She who had sent him forth on perilous quests now cried to him not to leave her. But Sir Guy would not listen. "Not yet one single deed for God

above!" was his lament. And he clad himself in a palmer's dress, and, with a gold ring of his wife's upon his hand, set out on a pilgrimage of penance to the Holy Land.

Once more did adventures, many and great, fall to Sir Guy, even in his pilgrim's dress; but he let no man know that it was the terrible Guy of Warwick, letting them think that the power of God was made manifest in a poor pilgrim. Afterwards, humble in heart and at peace with God, still wearing his pilgrim's dress, he returned to Warwick.

He was so changed in appearance that no one knew him; and when he humbly presented himself at his own door, begging for alms, he was received by his own wife as no more than an ordinary pilgrim, and entertained by her unawares. Sir Guy was more amazed to find that the proud and beautiful Felice welcomed him with a sweet and gracious humility, that she insisted on bathing his feet herself, and waiting upon him as he sat at table. Then he learned that, because her own husband was a pilgrim in the Holy Land, this great lady, ever since the hour of his departure, had spent all her days in doing human kindnesses. How sweetly she spoke of Sir Guy; how tenderly she listened to the poor; how graciously she comforted the sad and sorrowful; how lovingly she gave herself to the pleasure of children at her gate!

Then thought Sir Guy: "She is serving God. Who am I to come between her and God? I will go away."

Yet so great was his love for her that he could not bear to go very far from her dwelling. So he betook himself to a hermit's cell near by, and there for many years, in fasting and prayer, devoted all his thoughts to the great God who had made the heavens and the earth, and delighted his eyes in beholding the pure and holy life of his Felice from afar off. At last, grown old and grey, and feeling himself to be dying, he sent the ring of Felice to the castle by a herdsman, bidding him give it to the Lady Felice herself.

In the old days, when men gave up their lives to some great cause and went out into the world doing noble deeds, they would vow before the sacred altar to be true and faithful. This famous picture, painted by John Pettie, R.A., shows a brave knight's vigil all night at the altar, taking a vow to live nobly and right.

"Where got you this token?" cried Felice, very white.

"From a poor beggarman that lives in yonder cell," answered the herdsman.

"A beggarman! Nay! From a kingly man!" cried Felice. "He who gave you this ring is Guy of Warwick, he and no other!"

Then swiftly she flew to the hermit's cell, and lovingly she took the dying pilgrim in her arms, and softly they wept together. Husband and wife were united at last. Close to each other they clung, and happy were their hearts in the higher love which consecrates all mortal affection. And, under the roof of a hermit's cell, the splendid soul of Guy of Warwick rose to his God.

THE FIRE GOBLINS

A TALE OF THE LONG AGO FOR A WINTER'S NIGHT

MANY years ago the world was full of curious little people, called fairies and goblins.

The fairies danced in the fields on moonlight nights. They never did any harm, and often helped people in trouble, and were especially kind and good to children. They cared for little wounded creatures in the woods, mended the broken wings of birds and insects, and lifted the heads of the flowers when heavy storms had dashed them to the ground. The goblins lived inside the hill-tops, and worked underground, where they dug great caverns. They seemed to take pleasure in playing ill-natured tricks on anyone who wandered alone on the hills after sunset, teasing any small and helpless thing they might find, and they were always greedy and selfish.

They spent all their time gathering sunbeams on the mountains, and carried them down into the caverns, where they stored them for dark and sunless days. When a goblin had filled a cavern he would lie down to sleep in it, and his sleep would last as long as the sunbeams were left undisturbed. Sometimes they would steal little boys, and carry them underground, where they made them press down and pile together the sunbeams. These children were never allowed to go above ground lest they should tell of the wonders they had seen. They soon forgot all about their old life, and, after they had fed on goblin food seven years, became goblins too. In those days men and women who lived in the world were often very cold, when the sun did not shine, for they had no fires to warm them as we have.

Now, there lived in the wild forests of a great country a boy named Hephtus, who was not strong and well like most children, and he would often creep out into the sunshine, and lie there. The sunlight was his playfellow and friend, and when the winter came he would try to think of how he could lay up a store of sunshine as the squirrel laid up nuts. One spring day Hephtus was in the wood, puzzling over his plan, when, looking up, he saw a tiny fairy slide down a streak of sunlight to his feet. She had a crown on her head that sent out light like the rays of a star; her eyes were like the sky when the moon is very bright; her hair hung like soft, white moon-clouds around her; and her dress was sunset colour.

"I am the fairy Ignis," she said, as Hephtus stood trembling, afraid to move lest she should disappear. "I know all about you, and I have some work for you to do. Will you do it?"

"I am so weak and useless," he answered timidly. "There are a great many boys much stronger than I am; still, I will try very hard, Fairy Ignis, if you will let me."

"That's all I want," the fairy replied. "*You* are the boy I need, not the strongest, nor the best runner, but one who cares about things and tries to understand them. You love the sunshine. Will you go and bring sunbeams to men? These sunbeams lie buried in the earth, and I will teach you how to find them."

"Thank you!" he cried, springing towards her in his delight. "Tell me how."

"Listen, then! You must go alone on to the mountains where the goblins live, and they will carry you down to their caverns below. There they will chain you to the walls, and make you work day and night. Now, remember, you must not eat the food they give you. Take this phial, and when you are hungry swallow a few drops. I shall watch over you, and when you have seen and learnt all you can I will help you to escape. You will be a man when you come back. Will you live ten years down there to help me?"

Hephtus looked at the sunlight; he heard the birds singing again after the winter; a little rabbit frollicked close by; and a squirrel, tempted by the sunshine, had come out to nibble some fresh young shoots. He would see none of these things. Then he looked again at the fairy.

"I will do what you tell me," he said, "if you will help me."

"Lose no time," she answered, giving him a small bottle. The next minute he found himself alone at the foot of a mountain. While climbing he saw goblins darting about catching sunbeams, but he went bravely on, until he was surrounded, taken prisoner, and carried into darkness.

HEPHTUS MEETS THE FAIRY IN THE WOOD

"I AM THE FAIRY IGNIS," SHE SAID, AS HEPHTUS STOOD TREMBLING AND AFRAID TO MOVE.

Here he was set to work day and night, chained and watched at first, but careful never to eat the enchanted food they gave him. Sometimes he was unchained and allowed to wander alone through the long passages. They ran in every direction from a large central hall, and opened out on all sides into caverns, some newly hollowed, some half filled, and some closed up, where the tired fire goblins, having finished their work, had buried themselves.

At last his master came to him one day, and said: "Hephtus, you have worked well lately, and earned your reward; before long I shall have mine. For fifty years I have laboured fitting up my sleeping chamber, and I shall rest in it when the winter comes. When you have sealed up my cavern, carry the key to the central hall on the night when they hold their yearly feast, and lay it before the king, saying, 'My master bids me claim my reward.' Then the king will give you a goblet of rich goblin wine to drink, and confer on you the rights of goblinship, to choose and hold a cavern of your own, and the goblin power of catching sunbeams and changing them into crystals. He will also give you a proper dress to wear. This is all you need, and all I can do for you. Promise me that you will wrap me comfortably up and close my cavern tight."

"I promise," answered Hephtus; and soon after, when the fairy came to see him, she said: "Will you take my message to the earth people? Remember, they won't believe what you tell them; they will mock at you and ill-treat you. That is what they do to anyone who dares to try and teach them; and even when they have your gift you will find no gratitude, and get no thanks. Will you still go?" "I will go," he answered.

So the winter came; and Hephtus tucked his goblin master cosily up in his bed, and knew that he would be free as soon as he had given up the key of the cavern to the goblin king. He stood outside the goblins' hall, and heard the shouts of laughter and feasting.

"Come with me, and dance," cried a little brown-haired girl.

"I'm late to-night," he said, keeping in the shadow. "I'm not ready yet; but when I come I'll dance with you. Only take this key for me to the king."

The girl took the key and hurried away; while Hephtus, for the first time, felt sorry he had given his promise to the fairy. As he stood hesitating, his hand touched the fairy bottle he carried, and, taking out the cork, he swallowed a few drops, then turned and ran along the dark passages that led up above, shutting his ears to the tempting sounds, and thinking of the message he had to take to the earth people.

At last he found himself outside on the mountain, and, overcome with the light, he threw himself down on the ground. When he dared to open his eyes again, he saw that it was a beautiful summer's morning.

As he went through the villages, the children shouted after him because of his strange dress and his long hair; even the men said he was mad, and would not listen to him. At last he came to the palace of the king. The king's councillors tried to drive him away; but the king was good and wise, and listened to all that Hephtus said. When Hephtus had told him all, he said:

"I will go with you, and see if what you say is true. A hundred soldiers shall come, and a hundred men with pickaxes; and you shall show them where to dig, and if you have spoken falsely you shall die."

"I am content," answered Hephtus, with a deep sigh. So the king and Hephtus, and all the soldiers, with the men the king had chosen, came to the mountains, and there the king waited many months while they dug deep down into the earth. And when they had found the coal, Hephtus showed them how to build cages, and how to make the fierce little goblins work.

And the goblins still make beautiful caverns inside their cages. You can see them if you look through the bars of the grate; and when the caverns are red and hot they go to sleep. If you put your finger on the bars of their cage, the goblins will often bite you; but they are very pretty, and tempt little children to play with them.

But the goblins are dreadfully afraid of water, and if you throw some water into their cage they will spit and hiss at you as they die, for water kills them. But they are useful, and grown-ups can keep them in order. If they are lazy, we wake them up with the poker.

The next stories begin on page 1433.

A BRAVE LITTLE QUAKERESS

IT was late afternoon of the 2nd of December, 1777. A light snow was sifting down upon the streets of Philadelphia, covering the pavements and houses with a frosting of white.

In one house on Second Street, a woman, her tranquil face framed in a Quaker cap, sat at the window. The knitting had dropped into her lap and her hands lay idle. She sighed once or twice as her eyes rested upon the red-coated sentinel who marched up and down in the gathering dusk before the house across the street. The British were in possession of the town and the house opposite had become the headquarters of General Howe. Presently she saw the door of the house open and an officer came out. The woman could hear the faint click of the musket as the sentinel saluted. The officer hurried across the street and before the woman realised it, he was knocking at her door. She hastened to let him in.

"Can I do anything for thee?" she inquired. Her placid, even voice did not betray the agitation that she felt. The officer was the adjutant-general of the British army.

"I should like to use your room upstairs for a private meeting of some of my officers to-night," said the officer. Then as he was departing he added emphatically, "And be sure, Friend Lydia, your family are all in bed at an early hour. When my guests are ready to leave the house, I shall myself awaken you that you may let us out and extinguish the fire."

Lydia at once set about putting all things in readiness before her husband should return home for dinner. As she hurried busily to and fro her mind was keeping pace with her hands and feet. An indefinable feeling of uneasiness took possession of her. The British officers had met several times before at her house but to-night she could not shake off the presentiment that something of great importance was to take place.

Immediately after dinner, Lydia hurried her family to bed as soon as she could. Presently she heard a loud knocking at the front door. With a candle in her hand she slipped downstairs and let in the British officers.

Then she went to her own room and threw herself without undressing upon the bed. She tried to sleep, but all her uneasy fears of the afternoon came thronging back through her mind. What could those British officers be planning? Surely no good for the army of her own dear land. She lay there, her eyes staring into the darkness, her fingers clasping and unclasping each other in a spasm of nervousness. Presently she could bear it no longer. She sat up on the bed and feverishly unfastened her shoes and slipped them from her feet. Noiselessly she stole out of her room down the hall. For a moment she paused uncertainly by the door behind which the British officers were closeted. She could hear the murmur of eager voices. Then she caught a word that sent the hot blood pulsing into her cheeks. All her hesitation was swept away. She leaned forward and pressed her ear to the keyhole. A voice was reading a paper aloud. It was an order for the British troops to make a secret, night attack upon the American army encamped at White Marsh.

Lydia had heard enough. She fled down the hallway to her room and creeping into bed she tried to still the beating of her heart and to think. A few minutes later someone rapped loudly upon her door. Lydia

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paid no heed. It was as well for the officer to think that she was asleep. The knock came again, but still Lydia did not stir. Again it was repeated. This time with unmistakable loudness and impatience. Lydia rose quickly and opened the door. As she had expected, it was the adjutant-general, who had come to notify her that they were going. When the officers had left, Lydia returned to her room and to bed. But sleep was a stranger to her that night. Restlessly she tossed to and fro. She must save her fellow countrymen from the danger that threatened them, but how? How? If she told her husband and asked him to help her, that would place him in special peril as the sharer of her secret. No, no, — she would bear the risk alone.

"O Father in Heaven!" she prayed, "Guide thy servant in this, her hour of need." Presently her resolution was formed. She could not sleep, but now she could wait quietly for the coming of the day. She knew what she would do on the morrow.

She spoke to her husband at breakfast about the subject that was uppermost in her thoughts.

"John, if thee would not mind, I should like to go to Frankfort to-day to get some flour for our household."

"Certainly, Lydia," replied her husband tranquilly, "but thee must take the servant with thee to carry thy bag."

"Nay, I will go alone, for I cannot spare the maid from the house to-day. There is much work to do."

"Well, well, do as thee likes best," replied John indulgently as he departed on his business.

Lydia at once hurried over to the British headquarters to secure a written permission to pass through the British lines. Then with her bag under her arm, the demure little Quakeress set out through the snow to Frankfort, about five miles distant. There she left her bag at the mill, and slipping unnoticed from the town, she hurried in the direction of the outposts of the American army almost at a run. She knew that she carried her life in her hands for if the British learned of her errand, they would show her no mercy. Breathlessly, she pressed along the snow whitened road. Suddenly there came to her ear the steady beat of an approaching body of horsemen. The woman stopped, her hand pressed against her aching side, her heart choking into her throat. Suppose it were the British. Then she gave a little sob of relief. "Thank God!" she whispered, "Thank God!" The approaching horsemen wore the blue uniform of the American cavalry. It was a very quiet and composed little Quakeress before whom the cavalry officer dismounted and took off his hat.

"I would speak with thee, alone," she announced gravely.

"Very well, madam," he returned courteously. "Ride ahead, men. I will join you presently," he commanded. Then quietly and unhurriedly, Lydia disclosed her secret.

"I would ask thee not to betray to anyone whatsoever to whom thou owest the knowledge of this matter," she added when she had finished.

"I cannot thank you enough, madam, for the service you have done us," said the officer gratefully, "and you may rest assured that no one will ever learn from me the source of my information. Pray let me conduct you to a house nearby where you can rest and get something to eat before you return to town."

"No, I thank thee, friend," returned Lydia, "I must return with all haste or perchance someone may miss me and suspect my errand."

With a light heart, the brave little woman pursued her way homeward, carrying the bag of flour which had been the supposed reason for her visit to Frankfort. She had tried her best to save the American army, yet she was not wholly free from fear as to the results.

Two days later, a thunderous knocking on the front door of her home brought Lydia's heart into her mouth. She knew that the crisis had come. With a silent prayer on her lips she obeyed the summons.

A British officer stood before her. His face was dark and relentlessly

stern. He locked the door behind him and motioned Lydia to a seat.

"Were any of your family up, Lydia, on the night when I received company in this house?"

"No," answered Lydia, truthfully; "They all retired at eight o'clock."

"That is strange," growled the officer. He gnawed his moustache, frowned to himself, muttering,—"Very strange! Very strange! She was asleep, I know, for I knocked three times at her door before she heard me." Aloud, he went on to Lydia, his keen eyes searching her placid face for a sign of betrayal:

"I am altogether at a loss to conceive who could have given the information of our intended attack to General Washington. When we arrived near his encampment we found his cannon mounted, his troops under arms, prepared at every point to receive us. We had to march back like a d—— parcel of fools!"

"I sent the family to bed at eight o'clock," Lydia repeated in her even voice. "I do not believe any of them were up after that hour." The officer looked at the straight little figure standing before him for a minute, then he strode out of the house, clanging the door behind him.

When the resounding footsteps had died away, the small, gray figure slipped to its knees, face buried in hands. "Thank God," Lydia sobbed, "Thank God for a merciful deliverance!"

POCAHONTAS

A WHITE man squatted alone on the floor of an Indian wigwam. His bearded face rested in his hands and every now and then he scowled thoughtfully into the gathering gloom of the evening as he restlessly gnawed his moustache. The sound of guttural mutterings and of leaves scuffling under soft shod feet drifted in through the openings of the wigwam. The white man threw back his sturdy shoulders impatiently.

"If I am to be roasted and eaten, I might as well know it," he growled, "I am sick unto death of this delay."

Before the words were off his lips, the flap of the wigwam was pushed softly aside and an Indian warrior, hideously bedaubed with red and blue paint, slipped through the opening and stood before him.

"Let the White Father make ready to go to the emperor, the great Powhatan," the Indian announced impressively.

"I have been ready this long while," returned the prisoner shortly.

"The White Father must come with me." The Indian made a motion as if he would lay hold of the white man's arm. The prisoner stepped back.

"Keep your hands off me," he said harshly. "Lead on and I will follow," he added imperiously.

The Indian gave him a quick glance and the glance held hatred. He could not understand all the white man's words, but he had caught the tone of contempt and loathing. He turned on his heel abruptly and strode out of the wigwam.

The prisoner followed. For a moment a glare of light blinded his eyes. Then gradually he made out the scene into which he had been ushered. A great council fire blazed against the shadowy background of the forest. In the fitful light of the leaping flames, the prisoner could make out the forms of two hundred or more Indian warriors, all fantastically bedecked with paint and feathers like his guide. In the centre of the council a throne-like platform had been raised, and on the platform was seated Powhatan, the warrior chieftain, a robe of raccoon skins flung across his bronzed shoulders, his head decorated with the white feather head-dress of a chief.

The appearance of the prisoner was the signal for a blood curdling yell that came weirdly echoing back from the shadowy forests. He was conducted before the throne of Powhatan. In the solemn silence that had settled down upon the council, one Indian woman tendered him a bowl of water to wash his hands, while another

handed him a bunch of feathers with which to dry them.

After the ceremony of washing, an abundance of all kinds of food, cooked in the Indian fashion, was placed before the prisoner. Although naturally far from hungry, he forced himself to partake freely of the messes placed before him, while he coolly ran his eyes over the dusky throng gathered about, searching in vain for some friendly glance. Dark looks of hatred and distrust met him on every side. Suddenly his eyes met those of a little Indian maiden who was seated on the left of Chief Powhatan. He let his glance rest in hers for one brief moment only and then composedly went on in his inspection of the dusky, moving figures. But his heart beat faster. Could it be possible that he had read a message of sympathy in that quick, dark glance? Without seeming to do so he inspected the girl. She was little more than a child after all. The man guessed that she could not be more than twelve or fourteen years old. He reflected that Indian girls developed into womanhood very early.

At last the tiresome ceremony was over. There was a long consultation between Chief Powhatan and his warriors, which came to an end with a startling, ominous whoop. The prisoner's heart sank heavily as he tried to read his fate in the stolid, expressionless faces of the Indian braves. However, from the signs that passed between them, he knew that he was to suffer death. Two large stones were rolled before Powhatan. The prisoner watched the proceedings with stern calmness. He knew what was to follow.

Suddenly the Indians nearest to him laid hold of his arms and dragged him to the spot. With eager, savage fingers they forced him to his knees and pressed his head down upon the stone block. A warrior stepped forward with a huge club. They were going to beat out his brains. The savage waited with upraised arm for Powhatan's signal. The prisoner closed his eyes and snapped his teeth firmly on his lower lip. He would show these savages that a white man could die as stoically as any Indian brave. The awful, waiting hush was broken by a sudden, piercing shriek. The man with his head on the block opened his eyes — startled. A slim, dusky figure flashed from Powhatan's side. Two brown arms were thrown about the white man's neck. Then a shout of wonder broke from the savage multitude.

"Pocahontas!"

It was the idolised daughter of their mighty chief who had placed her head between the White Chief and the executioner's club.

"No! No! Slay him not! He shall not die!" The girl was crying in her mellow Indian tongue.

The Indian executioner, confused and abashed, let his uplifted club fall slowly to the ground. He dared not strike, or the blow would fall on the head of the darling of their tribe. Before he had time to gather his thoughts, Pocahontas arose and darting to her father's side, threw her arms about him. Brokenly, with the tears streaming down her cheeks, she pleaded for the white man's life, pleaded with the stern old chief who showed mercy to no man. The girl spoke with an eloquence and passion that moved the multitude of crowding savages. Suddenly exhausted, Pocahontas slipped to the ground and hid her face against the chieftain's knees, choking. A shout of sympathy rent the crowd. Powhatan raised his hand with a silencing gesture.

"Let the White Chief go," he said slowly.

Again a wild shout went up from the multitude, and this time it was a shout of delight. Pocahontas had completely won them to her cause. The white man's life was saved. A few days later the prisoner, whose name was Captain John Smith, returned to Jamestown and his own people, and in his heart he bore with him a lifelong gratitude to a little, dusky Indian maiden — Pocahontas.

THE GRASS OF THE FIELD

CONTINUED FROM 1177

GRASS is one of the commonest of all things. It is also a thing of beauty and wonder; but it is so common that we seldom pause to admire its beauty or to think of the wonder of its structure and habits. We ought to do all this, for grass is one of the most important things that exist on this earth. It is almost as needful to us as air and water. Many millions of people in the Far East live chiefly on the seeds of a grass called rice; and even in this country we should do ill without grasses, for our bread and cakes are made from the powdered seeds of a grass called wheat.

It is true that we do not eat the common green grass of the fields, but sheep and cattle do; and but for the grass we should have neither beef nor mutton—neither milk, nor butter, nor cheese. Although we treat it roughly, even treading it under our feet, the grass is worth more to us than all the lilies and roses in our gardens.

Wherever there is a little patch of bare earth, whether in town or country, it will not be left long before grass springs up, and covers it with a green carpet. It is always striving to fill up the beds and borders of the garden; and if the roadman did not take care, the grasses would spread from the fields and cover the roads. There are over 3,000 kinds growing in different parts of the world, and over a hundred kinds in this country.

If you were walking through a meadow of tall, flowering grasses just before the reapers come to cut it for hay, and if you were to gather as many kinds as you could see, you would be surprised at their number. In the spring you may have walked through the same meadow, and, looking around, you might have said that there is only one sort of grass; but you could not say that when the tall flowering stems sway in the breeze.

At first the grass sends up only its long, narrow leaves, which are rolled up lengthwise, so that they can push their way between the broader leaves of any other plants that may be growing there, and so reach up to the light. Many of them have underground shoots, which are quite as sharply pointed, to enable them to force their way, however closely the earth may be crowded by the roots of bigger plants. And so they spread on all sides. The leaves may be eaten off by cattle or mowed down by man, but the grass-plant is not hurt, as other plants would be.

In summer it sends up its jointed, tubular stem, which is wrapped around by the lower half of each leaf, and the other half spreads out widely to catch the air and sunshine for its food. At the top of the stem the brush of flower-buds appears, and as it opens the flowers in smaller clusters spread widely on hair-like branches. They are so well-balanced, and the slender stem is so

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perfectly formed, that it is seldom one gets broken down by the wind, though if we walk through the long grass in the hayfield, we do much damage to it.

It is not easy to describe the flowers of the grasses. They are so different from the flowers of the garden that we do not talk of their sepals and petals, for they have none. Instead, they have a number of stiff, chaff-like scales to protect the stamens and pistil. These scales, when found wrapped around a grass seed or a grain of wheat, you would call husks, but in flower-books they are spoken of as "glumes" and "paleæ."

Let us suppose that you have gone into the field and found a stem of the sweet-scented vernal grass, which you will know by comparing it with the photograph on page 1342. This is quite a common kind of grass, and the one which gives the delightful fragrance to new-mown hay. Its flower-spike is one of the simplest, and you will have little trouble in getting one flower apart from the others. Let us have a sheet of note-paper laid on the table before we begin, and as we pull off each scale, we will lay it on the paper in the order in which it stood on the flower. The pistil ends in two long, hairy branches, and these will enable us to see that we are picking off only one flower.

The outer scale is larger than any of the others, and the next one is not much smaller. These two are known as the outer glumes. Next come two which are hairy, divided at the tip, and have a long, stiff bristle standing out behind the notch. These are known as the barren glumes, and the bristles are called awns. That makes four. The fifth is the flowering glume, and the sixth is the pale—smallest of all. These have blunt points; they are not notched, and they have no awns.

There now stand revealed to us two stamens, and in between these stands the fat little pistil, ending in the two long, hairy branches or stigmas. The stamens consist each of a long, slender stalk, on which is delicately balanced the large anther, which bursts and scatters the pollen powder on the breeze. Different kinds of grass differ slightly in the size and shape of these parts and in the way the flowers are arranged; but if you learn these details of one kind, you will have little trouble in understanding the others. In most kinds you will find there are three stamens, but in vernal grass two only.

The anthers hang out below the stigmas, and are so lightly poised that the softest breath of air shakes them, and away goes the pollen to get caught on the hairy stigmas of a flower-spike a little further down the field. The stigmas of a grass-flower are not ripe until the flower's pollen has been scattered. The fat pistil gets hard after the stigmas have caught some flying pollen-grains from another flower, and inside of it there is found, a little later, a ripe seed. The stigmas are hairy, so that they can easily catch the pollen as it blows along. At the time the grasses are in flower there is so much of this pollen floating in the air that we draw it in as we breathe, and some people who have delicate nostrils and throats suffer from hay-fever because of the irritation the dust-like pollen sets up.

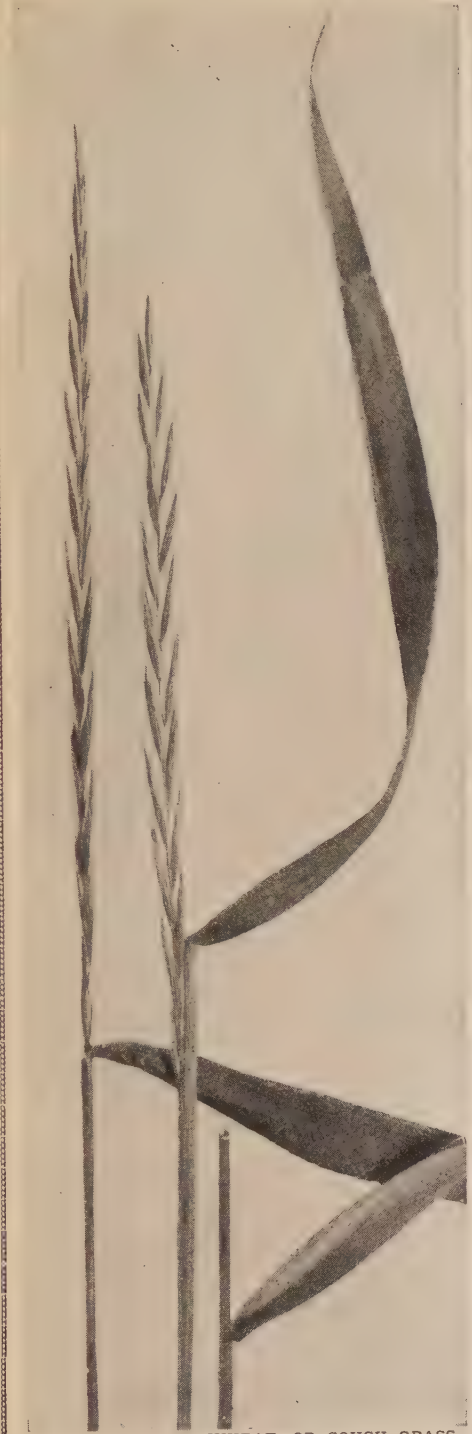
The awns on the inner glumes are believed to prevent the seeds being eaten by birds and other animals, their sharp points pricking the lips or tongues. In some cases also they assist the grasses to spread from place to place by sticking the seeds to the fur and feathers of the wild creatures. If you have been playing in the hayfield, you will find scores of them sticking in your clothes.

The stems of the grasses are made up of jointed lengths. The joints are swollen and solid, but between them the round stems are nearly always hollow. Their outer skin is made up of a coating of very thin flint, which makes them so strong to bear the flowering branches without breaking in the wind. If you look at a bamboo cane, you will understand the structure of the smaller grass-stems—for bamboo is only a giant grass.

The leaves of grass sometimes have their edges set with fine teeth, so fine that we need a magnifying-glass to see them; but if you draw the grass-blade between your fingers these teeth will cut you as badly as a sharp razor would. The hundreds of millions of grass-blades in a field are always giving out oxygen to purify the air, and when any moist air passes over them, their smooth, cold surfaces cause it to condense, and so keep the earth moist and fruitful.

The photographs in the following pages show us some familiar grasses.

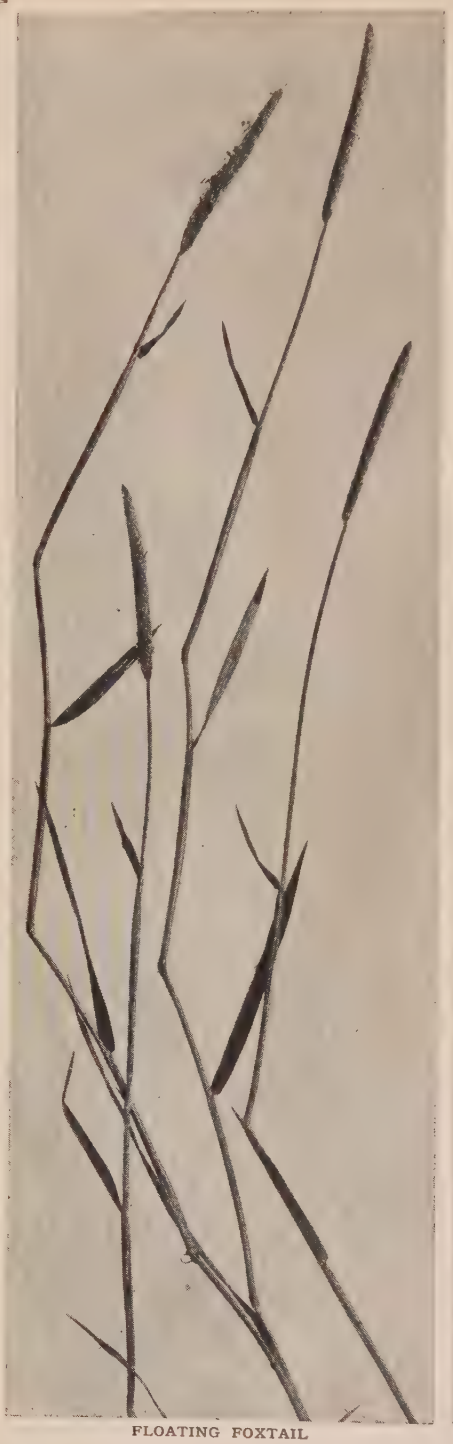
THE MOST FAMILIAR WILD GRASSES



FIBROUS-ROOTED WHEAT, OR COUCH GRASS
GROWING IN WOODS, IN JULY

CREEPING WHEAT, OR COUCH GRASS
GROWING IN WASTE PLACES, IN JUNE AND JULY.

Though we may find couch grass in the woods, it is no use to look for it in the same place year after year, for, if left to itself, it soon dies down. Sometimes it is called "spear grass." The picture shows why.



FLOATING FOXTAIL
GROWING IN MARSHY PLACES, FROM JUNE

COMMON SEA-REED, OR BEACH GRASS
GROWING IN LOOSE SAND BY THE SEA, ABOUT JULY

Floating foxtail is a kind of brother of meadow foxtail; but it is not useful, merely curious, because it grows wild in such very wet places. The sea-reed is very useful because it prevents the storms from washing the sands in which it grows away, and thus prevents the sea from encroaching upon the land.

YELLOW OAT GRASS

GROWING IN PASTURES AND MEADOWS, IN JUNE AND JULY

CRESTED DOGSTAIL

GROWING IN MEADOWS. FROM JUNE

Yellow oat grass is so called on account of its bright yellow flowers. It is cultivated in France, but rarely found in America. It is a great favourite with sheep and cattle. Crested dogstail is nearly always to be found where chalk abounds. That is why it grows in great abundance, for example, in England, on the downs of Kent.

SOFT BROME

GROWING IN MEADOWS AND PASTURES, FROM MAY TO AUGUST

SEA-LYME GRASS

GROWING BY THE SEA, IN JULY

Soft brome is a very greedy grass. That is to say, it devours all the nourishment there is in the soil, and leaves any other grasses which may be about to starve and die. Sea-lyme grass is very much like sea-reed, shown on page 1334, and even grown-up people, who should know better, frequently mistake one for the other.

WALL BARLEY
GROWING IN WASTE PLACES, FROM JULY

BARREN BROME
GROWING IN WASTE PLACES, IN JUNE

We can generally find wall barley in country lanes huddling up at the foot of walls, but not very often growing out boldly in the fields. Its bristly spikes are quite sharp. Barren brome is so called because it grows in barren places where few other things will thrive. It is common in England, but rarely found here.

SLENDER FALSE BROME
GROWS IN SHADY PLACES, IN JULY & AUGUST

CREEPING SOFT GRASS
GROWING IN WOODS, FROM JULY ONWARDS

Some people say that false brome does not really belong to the brome family at all, and that is why they call it "false." It is really, however, entitled to a place among the bromes. The roots of creeping soft grass spread or creep underground very quickly, and this gives it its name. Cattle do not care for this grass.

MEADOW BARLEY
GROWING IN DAMP MEADOWS, IN JULY & AUGUST

FLOATING MEADOW GRASS
GROWING IN DITCHES AND BY RIVERS, FROM JUNE

Meadow barley is very like wall barley, except that it grows in meadows instead of hiding away at the foot of walls Not only does floating meadow grass love the river-banks, but it often grows right up out of the water itself, sometimes bending over and floating on its surface, and it is commonly found in ditches from June onwards.

PERENNIAL RYE GRASS

ORCHARD GRASS

GROWING IN MEADOWS AND PASTURES, FROM JUNE ONWARDS

Rye grass is frequently to be met with in this country. It was the first grass to be gathered and cultivated in England. Orchard grass is very tall-growing. That is the reason why hares and rabbits are so fond of it, for not only do they eat it, but it is high enough for them to hide in.

WOOD MEADOW GRASS
GROWING IN WOODS, IN JULY

ANNUAL MEADOW GRASS
GROWING ALMOST ANYWHERE, FROM MARCH

Wood meadow grass is a valuable one from the farmer's point of view, as it grows so quickly after the cattle have nibbled it down. Annual meadow grass is the first grass to appear in fresh ground, such as when a railway embankment has been cut. The seed is carried by the wind, and quickly germinates.

PURPLE MOLINIA
GROWING ON WET MOORS, IN AUGUST

SWEET-SCENTED VERNAL GRASS
GROWING IN MEADOWS AND PASTURES, FROM MAY

Purple molinia gets its name from the dull purple colour of its flowers. Sweet vernal is a lovely grass with yellow flowers. That delightful scent of new-mown hay is due in a great measure to the fragrance of this grass. The sweeter the scent of the hay, the greater the proportion of sweet vernal grass in its composition.

MEADOW SOFT GRASS
GROWING IN MEADOWS, FROM JUNE

REED CANARY GRASS
GROWING BY STREAMS AND PONDS, IN JULY

Meadow soft grass has smaller seeds than the majority of grasses. So small are they that, by weighing and then counting a small number, it is calculated that it would take nearly two millions of them to weigh a pound.

The photographs on these pages are by Henry Irving

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 1409

THE KING OF THE CUCUMBERS

The King of the Cucumbers is a person of dignity. A large brass-headed furniture tack takes the place of an eyeglass in one eye, while the other is represented by a black carpet tack. His body is upheld by small rounded sticks, and his arms are wooden, too. The mouth, nose, and white of the eye are made by cutting away the peel.

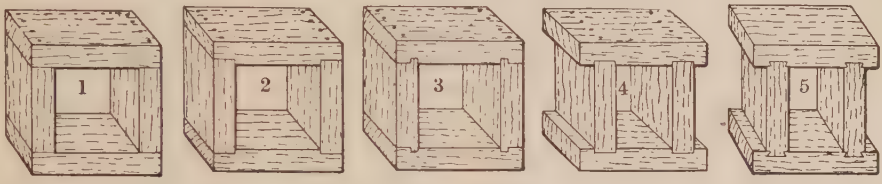
From "Lady Hollyhock and Her Friends," by Margaret Coulson Walker. Copyright by The Baker & Taylor Co.

HOW THINGS ARE FASTENED TOGETHER

MAKING SIMPLE JOINTS IN WOOD

CONTINUED FROM 1288

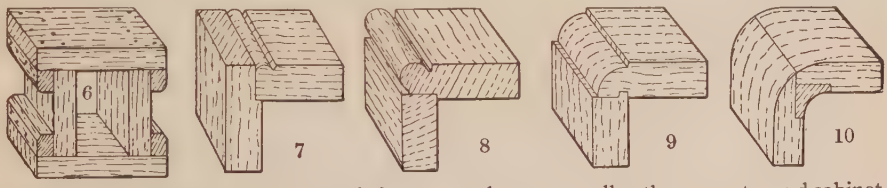
In the workshops and factories of the world many things are made, because Nature provides *materials* only for man's service. Man has to shape Nature's products to his needs. Materials are of vegetable, mineral, and animal origin. They include wood, metals, ivory, horn, bone, shell, and other substances. These have to be cut, or brought in some way into the shapes required for use. Therefore, when more than one piece is wanted in the making of an article, *jointing* is necessary.



A boy soon learns that all joints are not made alike. He sees his father glue a broken corner of a chair or table. His mother mends a broken basin with cement. The carpenter makes joints in which projections fit into recesses. He also uses screws and nails. The parts of an engine are united with screw-bolts. The parts of a steel bridge are fastened with steel rivets. There are more than a hundred different ways of making joints. And for every one there is a good reason why that one joint should be used rather than any other in a particular case. Here we will consider some of the simple ways of joining woodwork.

If you take a piece of board or, say, the cover of a box, you are aware at once that the direction in which the fibre, or the *grain*, runs is very important. You can perhaps bend and split it in the direction of its width, but not at all so easily in that of its length. The length is that in which the tree grows in height, and the fibres run in that direction. It is easy to split them apart, but not easy to snap them off crosswise unless the piece of wood is very slender. This is the first great difference which must never be forgotten when joints have to be made. You know, too, that sometimes a piece of board will shrink into a smaller width, or it may crack. But it will never become shorter lengthways, or crack in this direction. This fact, also, must be remembered.

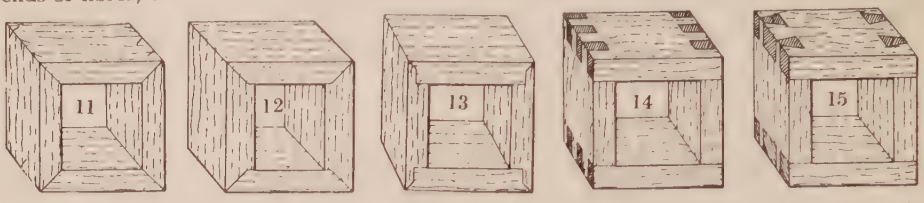
Further, some woods are much harder than others. In some the fibres are straight, in others they are curly. But, in all, the differences due to direction of grain just mentioned are present. And the lad working at home, as well as the carpenter and cabinet-maker, has to employ joints in such a way that they will hold firmly and are suitable to the kind of work, and to see that the grain of the wood is arranged in the *strongest* direction so that it will not shrink and crack.



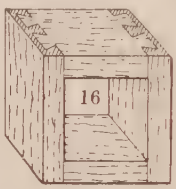
Glued Joints. Glue is one of the common cements, made from animal gelatine. It is applied hot to the surfaces of wood joints, and when cold it holds so securely that the timber will often split before the glue

will part. But the joint must be made *along* the direction of the fibres, not across them, and only a thin film of glue must remain, as too much glue spoils the joint.

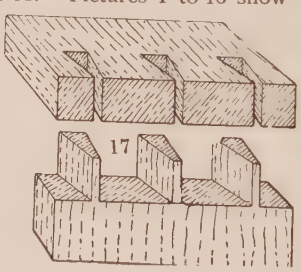
Glue makes a secure joint, because it runs into and occupies the minute vessels, as well as covers the surfaces in contact. If timber were like glass, glue could not unite it strongly. Neither will it hold well on the ends of fibres, or what is called *end grain*. You could not, for instance, trust glue alone to secure the corners of a box. Not only would the "hold" of the glue on the end grain be weak, but the glued surface would be too small to be strong. In some cases, therefore, a glued joint is as strong as there is any need for, while in others it is almost useless.



NAILING. Nailing is a strong and quick means of holding pieces of wood together. It is rather a rough way, because the heads of the nails show, and this, in cabinet-work, would spoil the appearance of otherwise neatly finished articles. Wire nails are used a great deal now, and are made in many different sizes and degrees of fineness. Screws are generally used in work that may have to be taken apart again and that cannot be treated roughly. The only way to get nailed work apart is to prise it with a chisel or screwdriver, or, in the case of a box, a hammer can be used to knock it apart. Nails in wood should always be placed so that, if any cutting is to be done with chisels, gouges, or saws, there shall be no risk of damage to the cutting edges through coming into contact with a hidden nail.

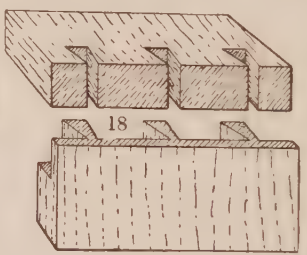


CORNER JOINTS. Pictures 1 to 16 show joints suitable for boxes and box-like structures. The simplest joint is in picture 1. In it the end pieces are nailed between the sides. If the box is longer one way than the other, the sides go the longest way. Plain joints of this kind are used a great deal, but only for rough work. Sometimes sides are *rebated*, as shown in picture 2. This prevents the ends from being knocked inwards, for nails alone are not sufficient to keep the parts exactly in position.



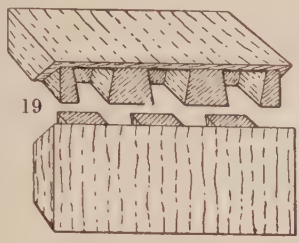
A better way is to form *tongues* on the ends fitting into grooves, as shown in picture 3. A stronger way still is shown in picture 4; but the sides then have to project beyond the end pieces, and there are not many cases where this can be allowed. Another improvement is shown in picture 5, where the ends fit into V-shaped grooves. This holds the parts together without nails. The ends, of course, have to be slid in sideways. Generally, such a joint is glued only, but it is troublesome to make, and is not often used. Picture 6 shows a rough but strong method, often used in making packing-cases. *Cleats*, or strengthening pieces, are nailed across the end pieces, thus strengthening them, and also increasing the joint surface, so that the box could not so easily be knocked "out of square" by rough usage as some of the others might. Pictures 7, 8, 9, and 10 show corner joints that are seldom used for entire boxes. The grain of the wood in these may run either way. In all the other examples it should only run the way shown. Pictures 7 and 8 are rebated joints, with a bead formed outside to improve the appearance and to make the line of the joint unnoticeable. Picture 9 has what is called an *ovolo* moulding at its corner, and 10 has both the outside and inside corners rounded. If its inside corner were square, it would not be necessary to fit in the piece as shown.

MITRES. Mitres are the joints used for neat, high-class box-work. The mitre, which in its simplest form is shown in picture 11, is the neatest possible joint, but there is no way of holding the parts together very strongly. The ends of all the pieces are cut to an angle of 45 degrees, and they then fit together as shown, with all the end grain hidden. Such joints are glued, but the glue does not hold well on grain cut at such an angle. Sometimes fine nails are used as well, but more generally sawcuts are made (as shown) after the pieces have been glued together and the glue has hardened. Into these sawcuts thin slips of wood or *keys* are glued, so making it difficult to pull the joint apart. Stronger joints are made by means of *stopped mitres*, as in picture 12, used when the sides are of different thickness from the ends; or, if they are of equal thickness, *lipped mitres*, as in picture 13, are strong. In these two last cases there are square



shoulders fitting, in addition to the portions which are cut at an angle.

DOVETAILS. The strongest corner-joints are made by cutting the joints so that they interlock. The simplest joint of this class is not really a dovetail, but is called a *lock corner*, and is seen in picture 14. These corners are cut by machinery, and are used chiefly for light and small boxes for packing things in. They are glued only, and are very strong, but the appearance of locked corners is not considered good enough for them to be used for anything but cheap boxes. In dovetailed joints, seen in pictures 15 and 16, the interlocking portions are wedge-shaped instead of parallel, like lock corners, and therefore there is only one direction in which they can be put together or drawn apart. These, also, are usually only glued.


19

You will observe that the ends of the dovetails have rather an unsightly appearance, and that the joint is not so neat, in fact, as the mitred one. But you may also have dovetails which are not visible, termed *secret* dovetails. They do not go right through, but only a part of the way into the sides, and there are several ways in which they may be fitted.

Pictures 17 and 18 show the separate parts of joints like those in 15 and 16. That at 17 is a dovetailed joint, and is the strongest way to join two pieces of wood. That at 18 is called a *lap* dovetail. It is secret only when viewed from one face. It is used chiefly for drawers. Picture 19 is a secret dovetail, which, when together, appears on the outside as a mitred joint.

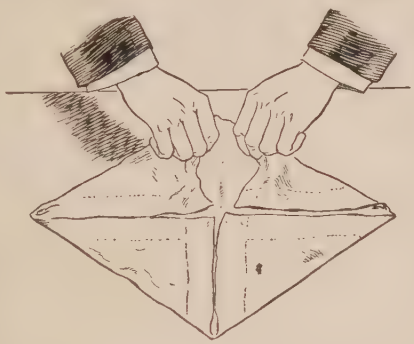
Secret dovetails are often made to appear on the outside the same as 13. Secret dovetails are, of course, more troublesome to cut, and are not so strong as plain dovetails, but, for the sake of neat appearance, they are preferred in high-class cabinet-work.

Strict accuracy in cutting is necessary for all dovetails, so that their fit may be perfect.

THE DISAPPEARING QUARTER

THIS is a capital trick. Two things only are wanted for it—a handkerchief spread out upon the table, and a quarter laid in the middle of it. The corners of the handkerchief are folded down over the coin, and anyone is permitted to feel that it is still there. And yet, at the conjurer's command, it passes through handkerchief and table, and is found on the floor beneath. The handkerchief is shaken out, and proves to be empty. This trick is good enough to make quite a reputation for the youthful wizard, and yet it is simplicity itself—when you know it!

In the first place we must have two quarters, in appearance as nearly alike as possible, and one of these we take an opportunity to drop quietly beforehand under the table at which we propose to perform the trick. The only other thing required is a little pellet of beeswax, the size of a peppercorn. This we must knead between the fingers till it is fairly soft, and then press, till needed in another sense, against the hinder part of our lowest vest button.



To perform the trick, take the wax off the button, and press it against one corner of the handkerchief which you are going to use. Then lay the handkerchief on the table squarely in front of you, with the waxed corner nearest to the right hand. Lay the quarter on the centre of the handkerchief, or, better still, let somebody else do this, to prove that there is "no deception." Then fold down the corners of the handkerchief one by one over the coin, beginning with the waxed corner, and pressing this down a little, so as to make it adhere. This done, we ask someone to make sure, by feeling through the handkerchief, that the coin is still there. Each person who does so presses the wax a little closer.

Now comes the exciting moment. "Now, ladies and gentlemen," you say, "I am going to make the quarter pass right through the table, and be found upon the floor. If you will all be very quiet, perhaps you will hear it fall." They won't, but they may as well imagine that they do so.

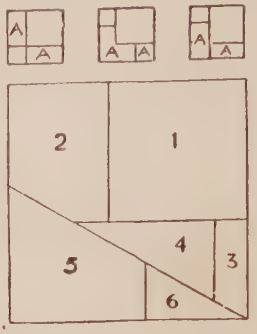
We blow upon the centre of the handkerchief, saying, "Presto! Pass!" Then, hooking the first and second fingers of each hand inside the nearer opening of the handkerchief, as shown in the picture, we draw the two corners smartly apart, one in each hand, and shake it out. The coin, adhering to the handkerchief, is drawn into the right hand. "Look under the table, and see whether it has gone through," you say, and while general attention is occupied by looking for and picking up the other coin, you will have ample opportunity to get rid of the one in the hand.

Of course we are not bound to make the coin pass "through the table." If we prefer it, we may order it to pass under a candlestick, into a vase on the mantelpiece, or even into somebody's breast-pocket. All that is needful is to place the duplicate quarter where we intend that it shall be found, and alter the command accordingly.

HOW THE LADIES CUT THE CARPET

THESE drawings show four ways in which the Japanese ladies might cut up their carpet according to the problem stated on page 1281.

In the first three drawings the carpet is divided into four pieces, and of these one sister has a large whole square; another, two parts (marked A, A in the drawing) which together make a whole square; and the third sister has a small whole square. If you take a thin piece of paper, you can trace the lines in the drawings, and cut out the pieces. In the second drawing there are a large whole square, a small whole square, and two parts (A, A) which, put together, make a complete square. In the third drawing you will again find that the two parts A, A make a whole square.



Now, supposing the carpet to measure 9 feet square, draw a square and divide the sides each into nine parts. Make a square on a side containing six of these parts. This square measures 6 feet by 6 feet, or 36 square feet; the small square in the opposite corner measures 3 feet by 3 feet, or 9 square feet; and the two remaining parts each 6 feet by 3 feet, or 18 square feet each; altogether 81 square feet.

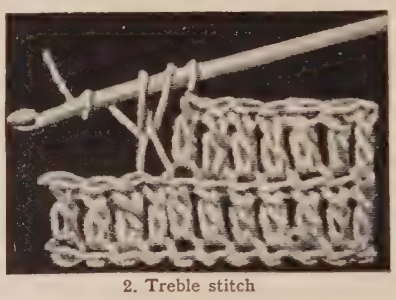
A boy or girl who understands Euclid, Bk. I. Theorem 43, and Bk. II. Theorem 4, will readily see how these two odd pieces of carpet together make a square, and how, in the other two ways of cutting the carpet, the whole squares can be made.

But if the carpet is to be divided up into three squares of *equal size*, it is necessary to cut it in the way shown in the fourth drawing, so that the first sister gets a square like the one numbered 1; the second sister a square made of pieces shaped like 4 and 5; the third sister a square made of pieces shaped like 2, 3, and 6.

A SIMPLE HOCKEY SCARF FOR GIRLS

CROCHET work is easily learned and quickly done, and with it one can make a great number of useful things. Wool, cotton, or silk thread can be used of innumerable shades, thicknesses, and kinds. The hooks are of steel for the thin cotton or silk threads; bone for wool and the stouter cotton. The size of the hook should be chosen to suit the thread in use.

1. Chain stitch

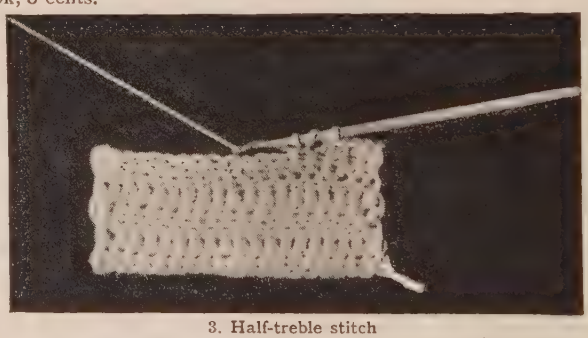


2. Treble stitch

The materials required for the hockey scarf are: 3 skeins of white Berlin wool, costing 69 cents; 1 skein of coloured Berlin wool, 23 cents; 1 bone hook, 8 cents.

First we think about crochet stitches. As a matter of fact there is only one, because all crochet consists of loops made by means of the hook connected by being drawn one through the other. The variations of this looping are called stitches. For the scarf we must learn three: 1, chain; 2, treble; and 3, half-treble. The chain is used as a foundation for the others. The other two stitches are used in alternate rows, backwards and forwards, first the treble, then the half-treble. This makes a distinct stripe in the pattern.

To make the stitches, tie a little loop in the end of the wool. Take the hook in the right hand, hold the end of wool in the left, and place the hook through the loop. Twist the wool once round the hook and draw it through the loop, thus making another loop through the first. We thus make 40 chain stitches.



3. Half-treble stitch

Twisting the wool round the hook to make another stitch is called an "over." So "making an over" is taking up wool on the hook by twisting it round once.

Treble stitches are worked into the row of chain already done. Keep the hook in the last chain (No. 40), make an over, insert hook in 39th chain, taking up two threads. Make an over, pull it through the 39th chain; make another over, pull it through two stitches on the

hook. Make an over, pull it through the two remaining stitches, and the "treble" is complete.

Then do the same again into the next chain. When you have done 40 treble, make one chain (this is to keep the edge even), and go back with the next stitch, called "half-treble." Keep the hook in the chain, make an over, insert hook in top treble of preceding row, taking up one thread only (that is, the one on the side nearest to you). As you work, make an over, draw it through the one thread, make another over, and draw it through all three.

We must not forget to take up one thread of the preceding row when doing half-trebles and two threads when doing trebles, or we shall alter the pattern.

Do a little piece like picture 3, which shows the half-treble. It will help you to get your stitches even, and teach you how tightly to hold the thread. Woollen crochet should always be loosely done. The wool is easily stained, and wears threadbare.

Occasionally count the number of trebles in a row to see whether there are still 40. It is very easy to miss one, or to make one too many.

Wool is sold divided into 1 oz. skeins, so the ¼ lb. will wind up nicely into four balls. Crochet three balls and about a quarter of the fourth into the scarf, and save the remainder for the edging and fringe.

4. The scarf complete, showing the coloured border and white fringe.

Next comes the border, which is a band of colour about 2 inches wide at each end. Make it in the same way as the rest, carefully joining the two wools with a tiny knot.

After the colour—which, by the way, may be your club colour—make another four rows of white, and then proceed to the fringe.

This is the easiest task of all, and this is how it should be done.

One has only to cut enough pieces of wool of equal length and knot them, two together, in between each treble of the last row. The best way to get the pieces even is to wind the wool round a piece of cardboard eighty times, and then cut them off along *one* side. This leaves all the pieces for the fringe ready to be threaded through in pairs and knotted once in the centre.

An ordinary postcard makes a good gauge upon which to wind the wool; it leaves the fringe a very suitable length—about 3½ inches. Make the fringe of the white wool, of course, and not of the coloured.

LITTLE PROBLEMS FOR CLEVER PEOPLE

THESE problems are continued from page 1288. The answers appear in that part of our book beginning on page 1501.

HOW MANY KNIVES AND PENS?

64. "You may give me three dozen pens and five dozen knives," said Uncle William when he was purchasing prizes for the boys at a Sunday-school picnic. Each knife cost twice as much as each pen. If he had bought three dozen knives and five dozen pens he would have saved $2.88.

What were the prices of the pens and the knives?

WHAT IS THE WORTH OF TIME?

65. An express train travels from Manchester to London at 40 miles an hour including stops. An excursion train runs from Manchester to London at 30 miles an hour including stops. The fare by the express train is one farthing per mile higher than the fare by the excursion train. Reckoning the value of his time, a commercial traveller decides that it costs him as much to travel by the excursion train as it does to travel by the ordinary train.

What is his time worth?

WHAT IS THE WORD?

66. There is a word of six letters, the meaning of which is made exactly opposite by changing the places of the two middle letters. What is the word?

WHAT WAS THE SUM?

67. Harry's sleeve had rubbed against his slate as he returned from school, with the result that many of the figures in his long division sum had become rubbed out. Putting a × to represent a place where a figure had become rubbed out, the sum was like this:

```
215)× 7 ×9×(1× ×
     × × ×
     ---
     × 5 × 9
     × 5 × 5
     -------
         × 4 ×
         × × ×
         -----
```

He remembered that the sum ended without a remainder, and, being a clever boy, he filled in all the figures that had been rubbed out.

How did he do it?

HOW MANY MILES PER DAY?

68. Hicks walked 117 miles, beginning on Sunday morning and finishing on Monday evening of the following week. He walked each day one mile further than the day before.

How many miles did he walk each day?

HOW MANY MARBLES HAD FRED?

69. "How many marbles have you?" asked Fred's mother. "Well," said Fred, "if you add one-quarter to one-third of the number, you will have ten more than half of the number."

How many marbles had Fred?

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO IN THE MIDDLE OF AUGUST

If there should happen to be a laurel bush inconveniently crowding upon your plants, you may cut it back this month, and the sooner you do it the better. But use a knife to do the work rather than garden shears, as you will with this be able to keep a more natural and graceful shape, and not cut through leaves, as happens with shears.

Perhaps the most important work of the month is the taking of cuttings. Those geraniums you planted out early in the summer have grown at least twice and perhaps three times the size they then were. If you have a window-seat in the house on which you can winter your flowers, or some corner in a greenhouse that in winter is heated, it is worth while to take cuttings at the present time, and then, beside the old plants you will take up before winter comes, you will also have some young ones for next year's planting,

How to pot the cuttings

Though we take a cutting of a geranium and describe how to treat it, it must be understood that the same operation and the same treatment will be needed for almost any kind of cutting that we wish to strike in a pot—fuchsias, bits of musk, the sweet-smelling scented verbena, etc. Make the cut which severs the cutting just below a joint, and, having secured the growth, trim off the lower leaves.

It is often said that cuttings, and especially soft-wooded cuttings like geraniums, strike root more easily when put in close to the sides of the pot. Put plenty of crock at the bottom of the pot in order to secure good drainage, then some nice light soil, with, if possible, a little silver sand mixed with it, and press it in firmly. Put your cuttings in their places, and fill up the pot with soil to about one inch from the brim, and press this also firmly down. Never fill up a pot with soil quite to the top, for if you do that you have no room to water properly.

It may be as well to say here that plants must not be over-watered. If the soil is continually in a saturated state, the plant decays and dies. The habit of keeping saucers under the pots to catch the water as it drains from them is a very bad one if the water is allowed to remain in the saucers. The water that drains into them should be emptied out *at once;* but for pots of cuttings there is no need to use saucers at all, for the pots may stand for several weeks yet in some sunny spot out of doors, standing on a board or a little bed of ashes, so that worms do not penetrate.

People seem very fond of the bright yellow calceolarias as summer flowers for the garden. But if you are to take cuttings of these, wait until October; that is quite soon enough for calceolaria cuttings.

There are more seeds to sow this month—indeed, there are but few months when we may not do a little seed sowing. Just now we may sow pansy seed—yes, and, more than that, if there be a few little vacant spots you may sow the seeds of some more hardy annuals. You remember you sowed some of these in April, and probably at the present time they are in full flower and beauty. Now, it is good to sow the seed in the spring of these annuals that are really and truly hardy, but it is even better to sow the seed, or at least some of the seed, in the early autumn.

I am going to ask you to sow the seed of some blue cornflowers some time during the next fortnight. You need the merest pinch of seed, even the smallest packet is more than enough. In a very short time you will have a number of tiny plants. Thin them out—always thin them, even if you have only half a dozen plants left—for these autumn-sown plants are going to be twice the size of any you sowed in the spring. When they are four inches high, or thereabouts, very carefully pinch out the top of the growth. There will be three growths in the place of one, and you understand what a more bushy plant this means. But, more than this, if you wait until the spring you may pinch back each of those three growths, and make the plant far bushier still. You can move it, too, in the spring, if you wish, though it will be finer and better to let it flower where it is.

Cornflowers

You may ask why you were not advised to pinch back the cornflower plants you sowed in the spring. Chiefly because there is not the same long period before they need to flower, so that to do this in the spring would delay the blooming too long. Cornflower plants treated in this fashion will take as much room as three others, but let them have this space, for they are going to bear hundreds of flowers, and bloom nearly twice as long as spring-sown specimens.

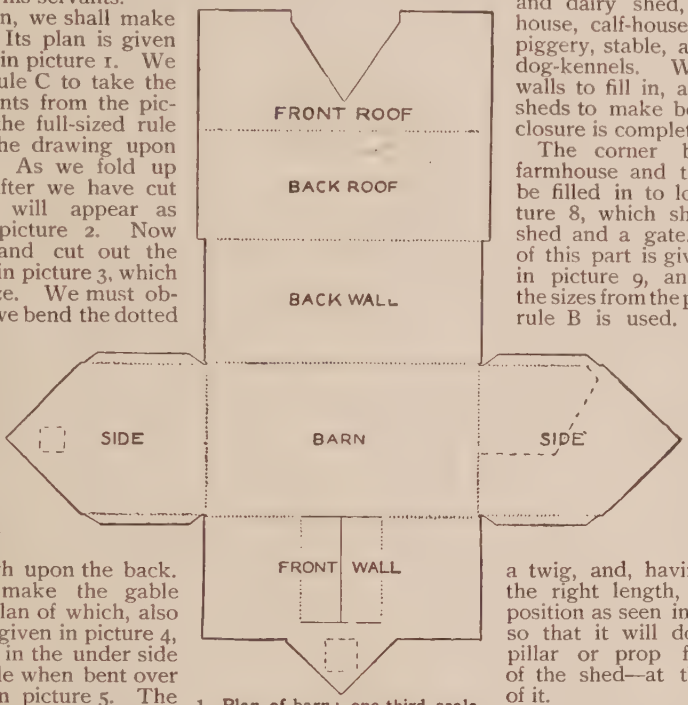
You may also pinch back snapdragons, and Blue Beard, and wallflowers, to mention but a few.

Notice, as you go about the garden, the plants that look particularly pretty when planted side by side; notice what makes a good edging plant, and what is best to put in the background. Notice, also, how people treat climbing plants; what they make edges with; what they do with rubbish; how a rose or a clematis covering an arch just seem to bring a most welcome bit of colour high above the level of the eye. We should have our eyes well open in the garden.

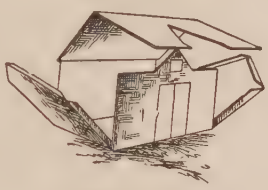
COMPLETING MODELTOWN FARM

We have already made the farmhouse and the dairy, also the houses for the cows, horses, pigs, and hens. The only important farm building that remains to be made is the barn, which is a very necessary part of the farmsteading. Crops may be stored in it, and the many different kinds of farm implements and machinery. Then, having made the barn, we shall make and fit up the various walls upon a large board, which will represent the ground upon which the farm stands, and we shall arrange upon this cardboard ground the many buildings we have erected in convenient positions for the work of the farmer and his servants.

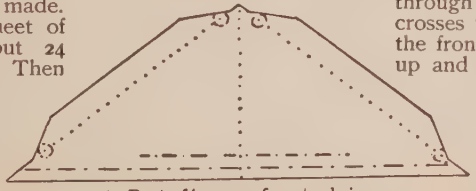
First, then, we shall make the barn. Its plan is given third-scale in picture 1. We use scale-rule C to take the measurements from the picture, and the full-sized rule to make the drawing upon the card. As we fold up the card, after we have cut it out, it will appear as shown in picture 2. Now we draw and cut out the plan given in picture 3, which is actual size. We must observe that we bend the dotted lines which have the circles from the back and not from the front of the card, so that we must cut the card half through upon the back. Then we make the gable strut, the plan of which, also full size, is given in picture 4, and glue it in the under side of the gable when bent over as shown in picture 5. The gable should now be glued to the roof of the barn as seen in picture 5, and the completed barn, with its wide swinging door, is seen in picture 6.



1. Plan of barn: one-third scale
Use rule C



2. Folding up the barn



3. Part of barn roof: actual size

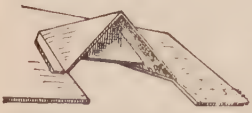
We now give attention to what is perhaps the most interesting part of our farm work—making the ground-plan of the farm itself, with places for all the buildings that we have already made. We must have a sheet of strawboard, say, about 24 inches by 15 inches. Then the plan given in picture 7 must be drawn upon this strawboard. The picture is one-third scale, so that we use scale-rule C to take our measurements, and our full-sized rule to draw the lines on the card. The lines in the picture are all solid black lines, but in this case we do not cut out the card at these lines. In fact, we shall not cut the card at all, but merely have the whole sheet of strawboard its full size. Then at a later time we may put other articles outside the farm proper, in the ground around the farm which the outer part of the strawboard will represent.

Having drawn the plan in picture 7 on our strawboard, we can glue down the houses in their proper places—the farmhouse, dairy and dairy shed, barn, cow-house, calf-house, hen-house, piggery, stable, and the two dog-kennels. We have the walls to fill in, and two more sheds to make before the enclosure is complete.

The corner between the farmhouse and the barn will be filled in to look like picture 8, which shows a cart-shed and a gate. The plan of this part is given half-scale in picture 9, and in taking the sizes from the picture, scale-rule B is used. When this has been cut out, it is folded up and glued to the strawboard so as to make the corner as shown in picture 8. We must get a twig, and, having cut it to the right length, glue it into position as seen in the picture, so that it will do duty as a pillar or prop for the end of the shed—at the wall end of it.

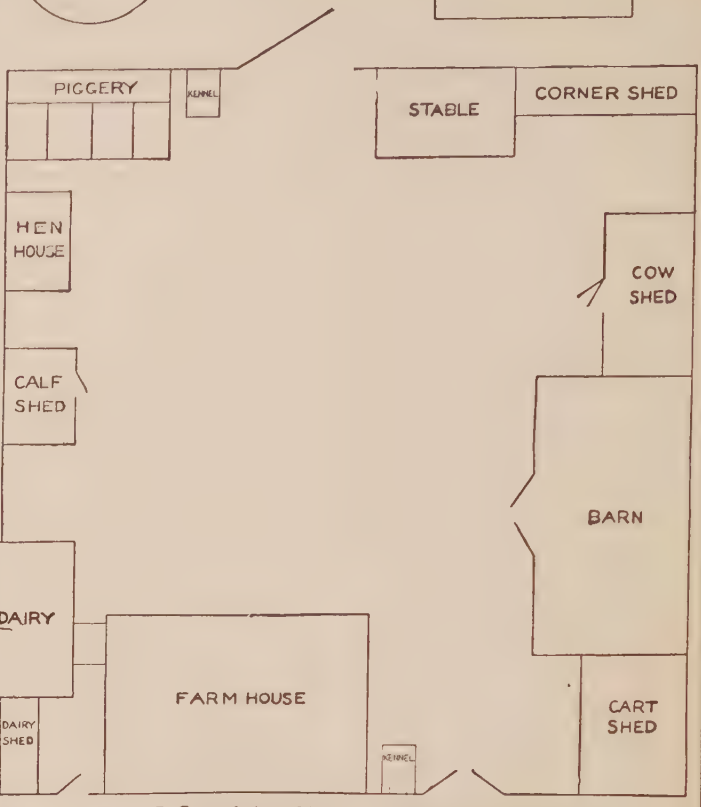
The next corner for our attention is that between the stable and the cow-shed, which, when finished, will look like picture 10, with a corner shed having a wall along part of its front. To make this, the plan in picture 11, which is half-scale, must be drawn on card, using scale-rule B, and then cut out. By making two pinholes through the centres of the crosses we find where to glue the front wall inside. Folded up and glued into position to the wall of the stable at one end, and to the wall of the cow-shed at the other end, the result will be as shown in picture 10.

4. Gable strut: actual size

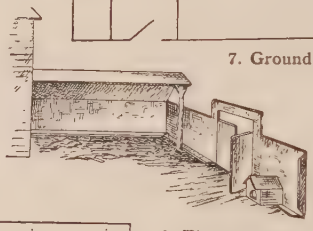


5. Gable window

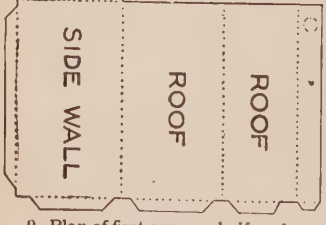
6. Barn complete



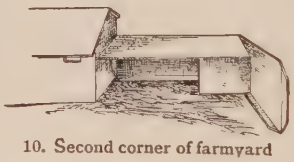
7. Ground plan of farm: one-third scale. Use rule C



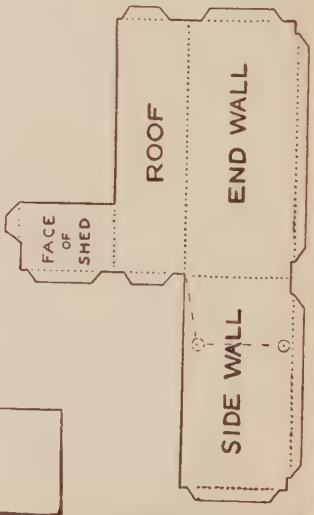
8. First corner of farmyard



9. Plan of first corner: half-scale
Use rule B



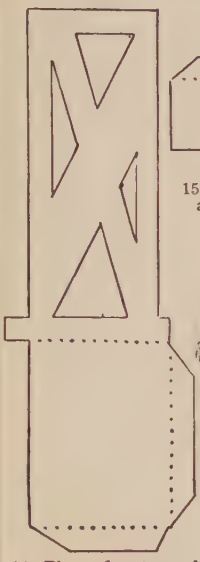
10. Second corner of farmyard



11. Plan of second corner
half-scale. Use rule B

12. Plan of farm wall: half-scale. Use rule B

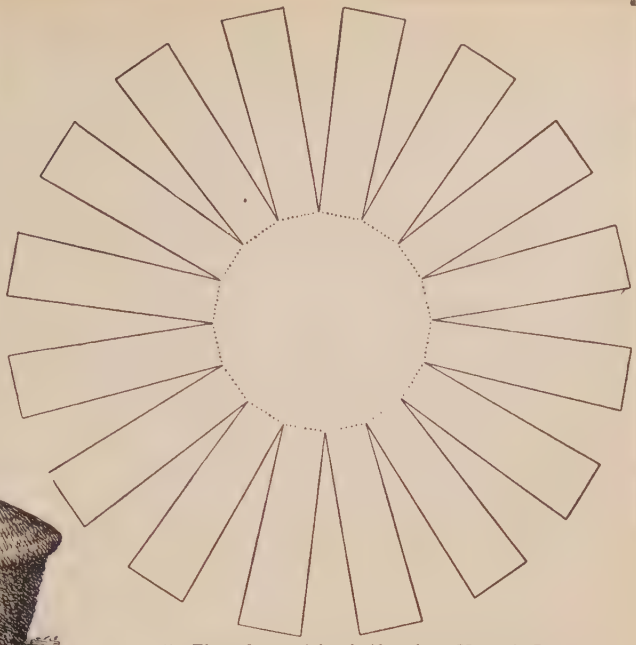
13. Fourth side of farmyard



14. Plan of gate and wall: actual size

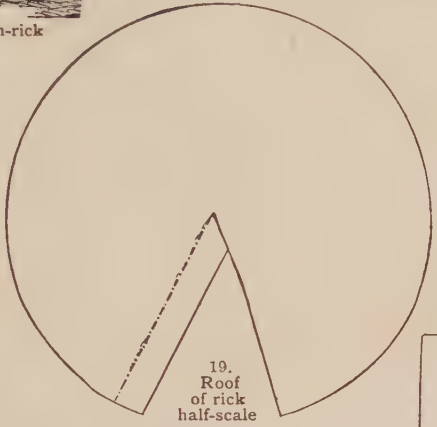
15. Short wall actual size

16. Corn-rick



17. Plan of corn-rick: half-scale. Use rule B

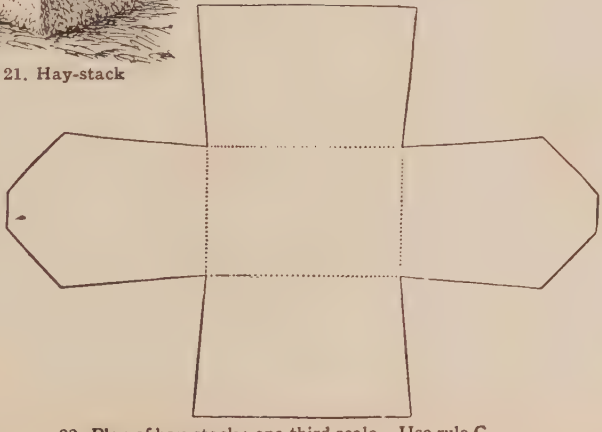
18. Rick bent up



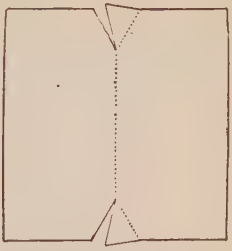
19. Roof of rick half-scale

20. Top of rick

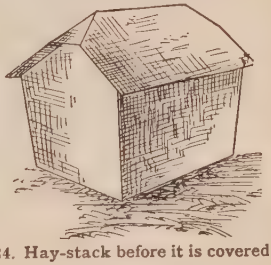
21. Hay-stack



22. Plan of hay-stack: one-third scale. Use rule C

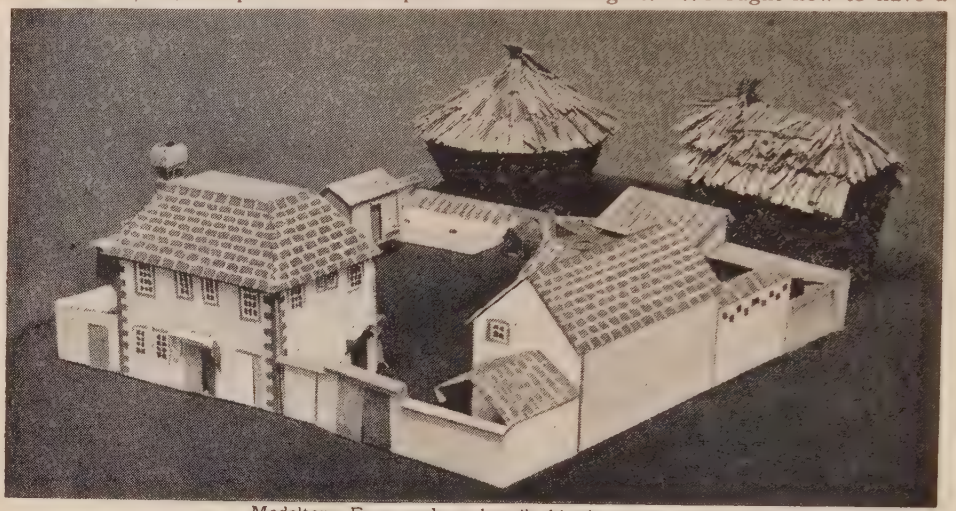


23. Roof of hay-stack: one-third scale. Use rule C



24. Hay-stack before it is covered

The dairy, the calf-shed, the hen-house, and the piggery are already in position. A wall will extend from the dairy to the piggery, and thus enclose the farmyard on that side. The plan of this wall is given half-scale in picture 12. The end with the folded slip will be glued to the dairy, and the other end to the side wall of the piggery. Observe that the back of the dairy projects a little from the face of the wall outside. There remains only the fourth side of the farmyard to be finished, that between the piggery and the stable. This part is seen finished in picture 13. The plan of the larger portion is given in picture 14, which is made actual size, so that in drawing it we use the full-sized scale-rule, both to take the sizes from the picture and to make the drawing on the card. This part is glued to the end of the piggery and to the back of the kennel, as seen in picture 13. Finally, the plan given in picture 15 is drawn full size, cut out, and glued to the back corner of the stable, and this part also is complete.



Modeltown Farm made as described in these pages

Upon that part of the farm ground close to the farmsteading, we frequently see on a real farm stacks of hay and of corn. We will take the corn-rick first. It is seen finished in picture 16. Picture 17 gives a plan of the body of the corn-rick. It is half-scale, so that we make our drawing by using scale-rule B. The plan is cut out and half cut at the dotted lines. Then the card is bent up, and it will be as shown in picture 18. The easiest way to make the sides stand erect in their proper positions is to take a strip of paper and gum it on inside the walls. Some postage-stamp edging will do nicely for the purpose.

To make the top of the rick, compasses are necessary. The legs of the compasses are set 2¼ inches apart, and a circle is drawn. This is making a drawing of the plan shown in picture 19, which is half-scale. Complete the drawing by making the two black lines leading from the edge, and the one chain line leading from the centre to the edge. Cut out at the black lines, and fold over until the chain line is close to the solid black line that goes from the centre to the edge of the circle. Now we glue the slip that goes under one edge, and hold it until it is firm, and have a lid-shaped top, as seen in picture 20. This we glue to the sides of the rick which we have already made. Now we cut pieces of straw—the thinner the better—into very short lengths, and, after covering the sides of the rick with glue, we sprinkle on the pieces of straw. We cut some longer pieces of straw, say, about one inch long, and split them if they are rather thick. Glue a band of straws on to the top right around the rim, projecting well over the rim, and about three-quarters of an inch up the top. Glue on another band higher up, projecting over the first band, and then a third band in the same way. Finally, take about a dozen thin straws and tie them into a tight little bundle close to one end, spread the other end, and place them upon the pinnacle of the rick and fix them with glue. We ought now to have a very realistic representation of a corn-rick as seen in picture 16.

Lastly we make the hay-stack, a picture of which is given in picture 21. Its plan is given one-third scale in picture 22, so that we use scale-rule C for taking the measurements. Having drawn and cut out the card, we fold it up as usual, either gluing the edges to each other or using gummed paper inside the stack. The top or cover is given in plan in picture 23, and this also is one-third scale, so that again we use scale-rule C. When we have cut out the card and bent the roof, we find that the ends at the top take the form in picture 24. We glue these parts into the form there shown, and finally glue the top to the sides. Then we cut into very small portions some sweet hay, glue the sides of the stack, and sprinkle the chopped hay over the card. We thatch the top like the corn-rick, and so complete Modeltown Farm.

THE NEXT THINGS TO MAKE AND THINGS TO DO BEGIN ON PAGE 1501

WHAT THIS STORY TELLS US

THERE is only one nation in the world that has a whole continent to itself. It is Australia, a part of the British Empire, as far from England as it can possibly be, for it is exactly on the other side of the earth. England's midday is Australia's midnight; England's summer is Australia's winter. We read here the story of the way in which this great wild country, still the home of black savage races when our great-grandfathers were born, has become a white nation. It is a great, strange land—a land of fruitful areas and pathless deserts, of tremendous mountains and enormous forests, and if there were not trains and telegraphs and newspapers and all signs of civilisation there, we might think sometimes that Australia was still at the beginning of time. For here live still the oldest animals in the world, birds with hairs instead of feathers, jackasses that laugh, swans that are black, and foxes that fly.

AUSTRALIA, THE GREAT SOUTH LAND

CONTINUED FROM 1248

TO visit Australia, where there is the only people in the world inhabiting a whole continent, we must travel part round the globe, for this part of the British Empire is very far away from the United States, almost, in fact, on the other side of the great earth-ball on which we live over the whole of this vast territory.

When we, the English, and our friends in Canada are fast asleep at night, the Australians are in the midst of their brilliant day. When we are keeping Christmas in mid-winter with frost and snow, the Australians are keeping it in midsummer, with a festival of bright flowers and hot sunshine. When they look up to the beautiful night-sky over their heads, they see quite different stars from those we know so well in our northern half of the world—the Pole Star and those of the Plough. It is the stars of the Southern Cross that flame so brightly over the land that has taken them for her emblem.

What a huge, solid mass of land Australia looks on the map! Sometimes it is called the largest island in the world; sometimes the smallest continent. It is twenty-five times larger than the British Isles, and almost as large as all Europe. Let us see how it has come to pass that the Union Jack, together with the stars of the brilliant Southern Cross, floats

We must go back to the times of the Stuarts for our first glimpse of it. A Spanish sailor, Torres, seems to have been one of the first explorers, and he left his name in the straits between the north of Australia and the island of New Guinea. The Dutch came next with many expeditions all through the seventeenth century, and for 150 years what was known of the island-continent was called New Holland. But neither Spaniards nor Dutch made colonies in the lands they found in this part of the world. Tasman, the explorer after whom Tasmania is named, did not even land in Tasmania, the island nearly as large as Scotland, that lies about 200 miles south of Australia.

About fifty years after Tasman, William Dampier, an Englishman, explored the west coast, leaving his name in Dampier Land, but he gave such a poor account of the dry and sandy coasts, and the barbarous natives he saw there, that for a long time no one cared to face the long voyage round Cape Horn or the Cape of Good Hope with so little reward at the end of it.

These first dwellers in Australia, owing to very poor food, were stunted and stupid. They generally lived a wandering life, sleeping in holes in the

ground. They were considered the ugliest and most uncivilised of all the native races. It is slow and difficult work to try to improve the blacks, who seem to be slowly dying out as a race; they have never been numerous nor of much account.

Now, before Wolfe made his famous attack upon Quebec, a young sailor-officer was sent to sound the St. Lawrence and make charts to guide the ships which were carrying the troops.

THE SAD CHAPTER OF AUSTRALIA'S STORY THAT BEGAN AT BOTANY BAY

So well was this work done that later he was sent by George the Third to the far distant and almost unknown South Pacific to find new lands for England there. This was the great explorer Captain Cook, who was gifted with untold energy and perseverance. He approached "New Holland" from the Pacific, and on board was a friend who had gone out with him to study anything new they might meet with in birds, animals and plants.

They called the east coast which they explored New South Wales, and the spot where they landed they called Botany Bay, because of the rich harvest of all sorts of flowers and plants.

Botany Bay! Those words, which bring a picture of brilliant flowers to our mind, are the heading of a very sad chapter of Australian history. Eight years after New South Wales had been claimed for Great Britain, a very different party from that composed of the gallant captain, the enthusiastic botanist, and their bronzed and daring sailors landed near Botany Bay.

HOW 700 PRISONERS FLEW THE UNION JACK ON THE BIRTHDAY OF AUSTRALIA

It was on January 26, 1788—now kept with rejoicing as the birthday of Australia—that 700 prisoners, convicted of ill-doing at home, stood, with those in charge of them, around a flag-staff which had been hastily raised, and cheered as the Union Jack was run up to the top, to float out on the breeze. Then the Governor made a speech, hoping they would make the most of their chance to lead a new and better life in a new country. Till this time, convicts like these, who had broken the law in England and were punished in those days by being sent out of the land, were transported over the sea to the American colonies; but, when these colonies declared their independence, the discoveries of Captain Cook were used as settlements for the poor miserable people. This first convict settlement in Australia is always spoken of as Botany Bay, but the Governor of the new little colony settled on the magnificent harbour of Port Jackson, a little further north, on the shores of which has grown up, in about 100 years, the splendid city of Sydney.

The little fleet of sailing ships bringing these first convict settlers had called on their way, during a long, dreary, cramped voyage of many months, at the Cape of Good Hope, to take in food and animals with which to stock their farms on arrival; for as yet there were no domestic animals in Australia; no sheep, cows, horses—not even rabbits; and no corn, nor vegetables, nor fruits, such as white people are accustomed to live upon. There was not a single animal from which to obtain milk, nor a single plant of which to make bread. At first there was much suffering from want of food and other necessaries, but by degrees farmers came out to settle, and things began to improve.

THE TROUBLED BEGINNING & THE WEALTH BEYOND THE BLUE MOUNTAINS

For a long time the colony did not grow quickly, for, besides the food difficulty, the presence of so many thieves and other idle characters was a great hindrance. Then, again, the great blaze of war which finished the mighty duel between France and England gave men plenty to do and to think about nearer home. The few who did go to Australia slowly settled the fertile and well-watered east-coast lands, and then the beautiful island of Tasmania across Bass Straits, for a rough and steep mountain range with great cliffs 2,000 feet high in parts shut them away from the wide uplands and deserts beyond them in the interior.

Then there came a change. A kind of sheep, famous for its splendid woolly coat, was brought to the colony at the beginning of the nineteenth century, and throve wonderfully. Then a way was forced through the rugged passes of the Blue Mountains, opening up vast grassy lands stretching away and away to the west. These "sheep runs" are often called the true wealth of Australia.

THE LAND OF WHEAT AND GOLD

A GOLD-MINE IN NEW SOUTH WALES AND THE TOWN THAT HAS GROWN UP AROUND IT

TEAMS OF HORSES PLOUGHING THE WONDERFUL WHEAT LANDS OF NEW SOUTH WALES

REAPING IN THE GREAT WHEAT-FIELDS OF NEW SOUTH WALES

Gold and wool and fruit are the chief things which make Australia rich. Science enables the gold miner to get every scrap of gold out of the rock he quarries, mostly in the highlands of the south-east and west. It enables the farmer to cultivate his land in the best possible way and to raise the most bountiful crops of wheat and maize. Science and honest toil make Australia one of the world's greatest storehouses of natural riches.

Next, at the end of the war, after Waterloo, many soldiers wanted employment, as did also the "hands" that were thrown out of work by the introduction of the rapid and tireless iron and steel fingers of machinery.

THE SHEEP RUNS FROM WHICH MOST OF THE WORLD'S WOOL COMES

And so men came out to Australia. They became shepherds, living a rough life in huts while tending large flocks, roaming over the open country; or they leased tracks of land of their own and were called "squatters." These now live in comfortable bungalows called "stations," and are often helped by the "blacks," who make good stock-men. The sheep thrive because the climate is mild, and there is plenty of room for them to wander about and to find the tufts of wild grasses and shrubs which suit them well.

There are millions and millions of sheep now in Australia, which supply the greater part of the wool used in the world. Shorn from the sheep's back, the fleeces are tightly packed and brought down to Sydney and other great ports to be carried over the seas to keep busy the mills and workers in the busy manufacturing towns of the United States and England. Yet it is only little over one hundred years since the first fleecy sheep were taken to Australia!

Some men's fancy led them to farming and gardening, especially on the strip of well-watered coast land on the east slope of the mountains. This Great Dividing Range, which runs down the east side of Australia, is something like the Pennines, which part Lancashire and Yorkshire. Both influence the climate of the country to east and west, and both hold untold wealth in their rough sides. In the Pennines it is chiefly coal; in the Dividing Range it is chiefly gold, and it was gold that made the next great change in Australia.

WHAT HAPPENED WHEN A SHEPHERD PICKED UP A LUMP OF GOLD

A shepherd picked up a lump of gold while looking after his flocks, and brought it into Melbourne, a small village at that time, when Queen Victoria was a girl. There is nothing that excites people more than to hear that gold can be found in any particular spot; and as it became more and more certain that gold was plentiful in Australia, men rushed with spades and pickaxes from every part of the world. Clerks threw down their pens; students and teachers threw down their books; sailors left their ships; policemen left their beats; lawyers, doctors, merchants—all caught the "gold fever" and sought for the precious metal which was to be found in the gravel of the beds of streams and in the mountain slopes of the Australian Alps, as the southernmost part of the Great Dividing Range is called, some 60 or 70 miles behind Melbourne. This city of Melbourne grew suddenly very rich, for in ten years $500,000,000 worth of gold rewarded the "diggers."

Now, all these diggers needed food and shelter and clothes, so the farmers got good prices for their meat, vegetables and flour, and a trade sprang up bringing manufactured things from England. Then, again, when the first richness of the finds abated, many of the diggers settled down to farm and grow fruit, or keep sheep on the lands they had discovered in their hunt for gold, and the land proved good for these purposes.

VICTORIA, AUSTRALIA'S SMALLEST STATE, WHERE THE GOLD COMES FROM

There was no question about the colonies growing now, and by degrees the states took shape as we see them to-day, starting from the large, original colony of New South Wales.

The gold colony, Victoria, about the size of Great Britain, was cut off from New South Wales in 1851. Although the smallest, it is one of the richest and most important of the colonies, and the most thickly peopled in Australia. Besides the gold which is still mined in it, Port Philip receives and sends away great quantities of wool from the pastures of rich grass which cover about three-quarters of the province, and the fertile soil and mild climate are good for growing all sorts of corn, fruits and vegetables. Its capital, Melbourne, is so fine with its wide streets, splendid buildings, its great trade, needing miles of busy wharves, that it is often called "Marvellous Melbourne." Trolleys, omnibuses, hansoms, motors carry passengers about as in America, and there is as great interest in cricket and football as in

THE NATURAL WEALTH OF AUSTRALIA

ONE OF THE WONDERFUL ORCHARDS OF WESTERN AUSTRALIA, WITH A VINEYARD BEYOND

THE ENORMOUS LOGS CUT FROM THE GREAT FORESTS OF AUSTRALIA LYING AT THE SAW-MILL

PREPARING WOOL TO BE SENT FROM AUSTRALIA INTO ALL PARTS OF THE WORLD

The wealth of the world is all in the soil. Men have only to develop it. Here by their labour they have created vast orchards and fruitful vineyards. They have cut timber which the steam-saws make into boards for building houses. They have bred sheep which yield abundant wool, that is packed up and sent away from the seaports to America and other parts of the world, to make warm clothes for us in winter.

any town in Great Britain. Crowded pleasure boats steam about the bay, beautiful tree ferns grow in the valleys close by, and delicious fruits are to be had for a few pence a pound in the shops.

NEW SOUTH WALES, AND HOW SQUATTERS HAVE BUILT UP ITS PROSPERITY

New South Wales threw off a northern colony called Queensland in 1859, but the land it has kept under its old name is twice as large as California. The chief industry of New South Wales is still wool. The squatter, who also rears great herds of cattle, has two great difficulties to face. One is that there is often very little rain for months together, and the food for the flocks and herds dies down—all but the shrubs which grow on the desert lands, and sometimes the poor animals die in thousands for want of water when the springs and rivers are all dried up.

The other difficulty is rabbits. It was a sad day when these little creatures were brought to Australia. They have increased so enormously that they often completely spoil a squatter's run by eating up all the grass needed by the sheep. Great efforts are being made to get rid of them.

New South Wales grows much fruit, such as oranges and peaches; also fine wheat and vegetables. At each side of its splendid capital, Sydney, are coal-mines; here is another Newcastle, black with coal-dust! There are other valuable mines, too, yielding gold, silver, copper, tin and lead.

Sydney is built all along the bays and promontories that make up the magnificent harbour. It is the fourth port of the Empire, as only London, Liverpool and Hull have a greater trade. Large ships can come up to any of the wharves right in the heart of the city, and busy little ferry-boats dart about from various points, carrying passengers and goods.

QUEENSLAND, AND THE NEVER-NEVER COUNTRY WHERE RAIN IS SELDOM SEEN

Queensland is about four times as large as California, and reaches right away to the north of Australia. The short slope towards the Pacific is hot and damp, and produces things which grow in this sort of climate, such as cotton and sugar and rich fruits. Higher up the slope is grown wheat, and above that in the highlands are wide stretches of downs where enormous numbers of sheep are fed. Passing on to the long westward slope the country becomes drier, and often great difficulty is found in getting enough water for the flocks and herds of cattle. Deep wells have to be bored, often without success, and after great expense. The part of Queensland that is subject to the greatest want of water is called the Never-Never Country. The Editor of this book has heard of a little Australian reader who had never seen rain when she was nine years old!

Brisbane, the chief city, depends on coal, found in its neighbourhood, and on wool. Queensland is rich in gold, copper and silver, and also sends away much timber.

SOUTH AUSTRALIA, THE WONDERLAND OF VAST DESERTS AND SPACES

As we look at the map, we realise the vast deserts that take up the centre and west of the island-continent. The province of South Australia, as large as France, Germany, Austria and Italy, put together, which is really a great slice of the middle of Australia from north to south, has most of this desert land. Many explorers have lost their lives trying to find out its vast unknown centre. It was not till 1861 that anyone succeeded in getting right across. A few years later, a splendid piece of work was done along this rocky and sandy track. Telegraph poles, telegraph wire, provisions, and all necessaries were carried from Adelaide on the south to Port Darwin on the north. Wells had often to be dug for water, and after two years of hard work and endurance a line of telegraph was completed over 2,000 miles long. Yet more than half of this distance had been travelled only once before by white men.

Thus Australia was connected with the rest of the world, for the messages flash from Port Darwin to Java, thence to India and the West. And so it is that we can read in our morning newspaper the account of yesterday's doings in the far southern hemisphere, whether they have to do with business about wool or gold, or with a concert or a cricket match.

There are no railways at present crossing Australia as they cross

THE BEGINNINGS OF A TOWN

CLEARING A FOREST TO MAKE WAY FOR A TOWN IN AUSTRALIA

DIGGING A HUGE TANK TO SUPPLY A NEW TOWN WITH WATER

OXEN MOVING A HOUSE WHICH HAS BEEN DIVIDED INTO TWO PARTS

This is the beginning of what may become a great city in Australia. First, strong men cut down the trees to give room for dwellings. Then others sink wells and make great tanks to hold the water. Others prepare sites for the houses, the wooden frames of which, ready made and roofed, are brought on wheels by oxen.

America, though there are many lines connecting the various towns and ports round the coasts with those of the mines and industries further inland.

A LONELY PART OF AUSTRALIA WHERE TRAINS GO ONCE A FORTNIGHT

From Adelaide, for instance, the train runs northward about 700 miles, but only once a fortnight to the last station on the line. When the bishop of this central part of Australia wanted to visit the settlers at the telegraph stations, which are about 150 miles apart from north to south, he had to ride or drive all the way, except the last 700 miles of train journey.

The climate of the settled south part of South Australia is like that of South Europe, and the same fruits grow in both, such as grapes, oranges, lemons, olives. A great deal of wheat, too, is sent away to Great Britain. Further north there are large flocks of sheep, and very valuable copper-mines.

Adelaide, the capital of South Australia, has fine parks and gardens, and behind it are lovely valleys, in which many kinds of fruits and vegetables are grown.

The richest silver-mine in the world lies in the bare desert country 350 miles beyond Adelaide. It is an astonishing sight to those who visit the spot. Scarcely forty years ago, Broken Hill was a lonely sheep station. Thousands of people crowded to it when silver was found, and now it is a large town. The huge engines for getting the ore out of the mines stand up against the sky. The furnaces and machinery give off incessant heat, amidst great noise, as they turn out tons and tons of silver and lead ready to go by rail to the sea-coasts. Then there is all the return traffic of fuel, food, and other necessaries, many of them brought from the other side of the world.

WESTERN AUSTRALIA, THE LARGEST STATE, AND THE ISLAND OF TASMANIA

Western Australia is the largest of the Australian states; four times as large as our Texas. A great deal of it is desert, like South Australia, and much is still unexplored. There are large forests; wheat and fruit are grown in parts, and there is country suitable for sheep and cattle. Gold forms the chief riches of West Australia at present. Great quantities are found at places where water has to be brought in pipes over 300 miles. Perth is the capital.

Tasmania, about the size of Scotland, is a beautiful island within a day's journey of Melbourne. Its narrow, fertile valleys are good for agriculture and fruit-growing, Tasmanian apples and pears being especially famous. From the sheep-farming comes very good wool. There is no trouble about want of rain in Tasmania, and the climate is so cool and pleasant that many Australians—especially from Queensland—come here to spend the summer. One of the most valuable tin-mines in the world is in Tasmania; there are also coal, gold and silver mines. Hobart is the chief town.

When we look at the divisions of Australia on the map, ruled off by the lines of latitude and longitude, we are reminded of Canada. As is the case with Canada, these large states with their straight boundaries are united, with Tasmania, under one common government.

HOW AUSTRALIA BECAME ONE NATION ON THE FIRST DAY OF THIS CENTURY

This federation took place on the first day of the twentieth century, and formed the great Commonwealth of Australia, which has, like Canada, a central Parliament, elected by itself to settle its own affairs, and a Governor-General sent from England to represent the king.

But how unlike are Canada and Australia in other ways! The north lands of Canada push up into the frozen waters of the wild Arctic Ocean; the north peninsulas of Australia reach up to the warm waters, infested with sharks, of the hottest part of the world.

In Australia there is no mighty river like the St. Lawrence, with its chain of lakes as large as inland seas, by which travel and commerce reach into the heart of the country. Many of the rivers and lakes in Australia dry up in summer, the Murray River with those that join it being the chief exception. Many of the lakes, also, are salt; and so it comes to pass that most of the centre of the continent—far away from moist sea-breezes—is a pathless stony desert, on which neither men nor animals can live. As we have seen, it is on the rim or edge of Australia, especially on the east and south-east,

THE TOWN, THE HOMESTEAD, & THE SCHOOL

ONE OF THE MANY TOWNS THAT HAVE SPRUNG UP IN THE VAST SPACES OF WESTERN AUSTRALIA

A NEAR VIEW OF A HOMESTEAD IN NEW SOUTH WALES

SCHOOL-CHILDREN LEARNING GARDENING IN WESTERN AUSTRALIA

While the farmer labours on the land, other men toil in the gold-mines. They all help to increase the wealth of the country. Towns spring up about the gold-mines, and near places where there are many farms. We see pretty homesteads growing up, and near them is the school, where the children are taught to carry on the work which their parents have so well begun. Here some of the schoolboys are carrying boxes of soil.

that we find most of the work and wealth for which the country is so famous.

We have seen, too, how far the fertile valleys and grassy slopes of the Great Dividing Range of mountains, together with the precious metals held in this rich storehouse of Mother Earth's, have all helped to make Australia what it is.

WHERE BIRDS WALK AND FOXES FLY AND SWANS ARE BLACK

No one knows how long before the white people came the poor savage blacks wandered over the broad continent, hunting the strange native animals, finding water, when all other water failed, at the roots of the desert plants, and living in holes in the ground.

Strange-looking animals and plants they are! There is the kangaroo, quite different from all other animals, with its powerful hind legs and tail, and a pouch for its little ones. The water-mole, with a bill like a duck, is equally curious; also the emu bird, which walks instead of flies. The kiwi wears hair instead of feathers; the laughing jackass and the brilliant parrots and cockatoos laugh or screech instead of sing. To crown all, the swans are black and the foxes fly!

The native plants and trees seem equally strange to us. Most of them shed their bark instead of their leaves; and many turn only the narrow edge of their leaves to the sun. The eucalyptus or gum tree grows to a great height, and gives a valuable medicine. Splendid timber comes from Queensland and other provinces, from great forests, very dull and grey-looking, lit up here and there with the vivid colours of the flying parrots and other gay birds. Many of the wilder parts of the country are covered for miles and miles with useless and dangerous plants, such as spinifex or porcupine grass and other prickly scrub. All these were the heritage of the "blacks."

THE GREAT ENERGY THAT HAS MADE AUSTRALIA A GREAT NATION

In the short space of time since the white nation came to settle in the island-continent, nearly every known plant that is good for food has been introduced, and finds some part of the country to suit it. Think of the work of the pioneers in getting the land ready, in choosing crops, in bringing to perfection all the produce of this wonderland.

Then think of the energy and hard work needed to start the mines and keep them going, often in hot parts of the country, and the anxieties and toil connected with farming, especially in the early days, when there were many difficulties, now smoothed away by new machinery, and by easy ways of carrying and packing and travelling.

Though so much has been started and accomplished in little over 100 years, every year sees some fresh outlet for the energies of Australians. The peaches that could neither be eaten nor sold, but had to be carried off in buckets to feed the pigs, because there were so many, are now tinned to feed human beings thousands of miles away. The grapes are made into wine, currants, and raisins; many fruits that would otherwise die are packed and sent oversea in cold chambers, just as quantities of beef and mutton are sent home, frozen hard in perfectly good condition. Manufactures of various kinds are starting, and only want a larger number of people to work them. In the four largest towns of Australia there are less than one and a half million inhabitants, and in the whole of the settled part of the continent there are not as many people as there are in London alone.

TEN THOUSAND MILES OF TRAVEL IN SIX WEEKS AT SEA

And now, having had a glimpse of what there is to see in Australia, shall we go to England by the Empire route—called the "All Red Route," because the whole of it is marked in the British colour, red, on the map—which has done so much towards linking up Australia with Canada and Canada with Britain?

We can take the steamer at Sydney, and make our way through the beautiful islands of the wide Pacific, gradually losing sight of the stars of the Southern Cross as we travel north. In about twenty-one days we shall slow down at Vancouver, the terminus of the Canadian Pacific Railway. About ten days more will bring us across the Dominion and the Atlantic Ocean to Liverpool.

There are many other routes if we prefer to go all the way by sea—through the Suez Canal or round the Cape of Good Hope or Cape Horn; but it will take six or seven weeks to complete the voyage of over 10,000 miles.

The next story of countries begins on 1459.

THE QUESTIONS IN THE WONDER BOOK

THE editors hope that you like the Book of Wonder in the volumes you have seen. The questions are those asked by real boys and girls, and among them you will find many that have puzzled you, we are sure. You may think that some of the answers are not very clear, and that is quite likely. Boys and girls have a way of asking questions that the wisest man cannot answer. Many questions which seem very simple cannot be answered at all, and about others the Wise Man can only tell you what students think. But there are hundreds of other questions which he can and will answer to your satisfaction. The last volume of our book will be an index, and in it you can find the whole list of questions which are answered in this department. You will be surprised to find how many there are.

WHERE DO THOUGHTS COME FROM?

CONTINUED FROM 1272

THIS is the question of questions, and there is no real answer to it except only just so much as will prevent us from believing false answers to it. We know certainly that the thoughts depend on the brain. If we are to do our duty to ourselves, we must regard the brain as the place where the real self lives. We must not poison it, we must not abuse it by depriving it of due rest, which we call sleep, and we should even think of every one of the other parts of our body as no more than its servants. The brain is the house of thought, but it is not thought itself, and though there is no harm in saying for convenience that the brain thinks, yet that will not do as an answer to our question.

There is a something which thinks, a something which knows. We cannot feel it, or see it, or cut it up, for it lies underneath all that we can see and cut up. The word substance means standing underneath—underneath the deepest that we can see. And so when you ask where the thoughts come from, I can only reply that they come from the thinking substance—the Something that thinks.

WHERE DO OUR THOUGHTS GO WHEN WE SLEEP?

Perhaps we should think of the brain as the instrument of the Something that thinks, as the violin is the instrument of the violinist. This, at any rate, is a beautiful idea which was expressed by a great Greek more than two thousand years ago.

When you ask where your thoughts go in your sleep, it is, perhaps, as if you had asked "Where does the music go when the violin or the organ is not being played upon?" When we are asleep the brain, or rather the highest part of the brain, is not acting. It remains alive, of course, and has the needs of a living thing. It requires pure blood, which is one reason why we should sleep in pure air, but it is resting as the violin rests in its case; so no thought comes from it.

We are never wholly asleep, however; part of our bodies is always working, and even part of the brain. Sometimes we can be sure that though the Self we know is asleep, yet part of the Self which we do not know so well is not asleep, for men have awakened with the answer to questions which they could not answer the night before. Many cases like this show that sometimes a certain amount of thinking goes on in our brains, even when we are asleep—or when, at any rate, the greater part of us is asleep.

WHAT MAKES US THINK?

In the first place, we think because it is our nature to think. We are thinking beings, and this it is which distinguishes us from all other creatures. We have brains so made that they are capable of being thought with, but we are very apt not to use our powers—just as the owner of a violin may leave it long in its case.

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It has been said that "men think very little and very seldom." Many of us are too much taken up with the business of life. We stop asking questions, though when we were children we used to ask many. This is a very great pity. We think when we are interested. There must be something to start us moving. When we grow up and have to earn our living we often cease to be interested in many things that really do matter, and simply stop thinking about them; but it is a pity we do not think about the best things.

CAN WE THINK ABOUT THINGS THAT DO NOT INTEREST US?

No. We simply cannot think of things that do not interest us; it is interest that starts us thinking. And so everyone who studies the human mind likes to see a child who is interested, wants to know, and thinks over things by himself sometimes. It is that, and not the look of him, which proves that he is a human being and not just a nice little pet animal.

The grown-up people who are wise and who discover new truth are those who do not stop thinking when they grow up—and this is because they have not lost their interest in things. It will not do to say that we cannot help being interested or not interested, for everything is interesting if we will only give it a chance. We have only to begin to think about ourselves, or the world in which we live, to find that the more we think the more interesting the things we think about become, and the more we want to go on thinking.

CAN ANIMALS THINK?

The answer to this question depends entirely on what we mean by the word "think." We should not say *think* when we mean *feel*, and we should not use the word thoughts to mean feelings, as nearly everyone does. To think is really to put one thing and another together in our minds, so as to make a link between them, and when the two things are linked together like this, that is a thought. To feel that you want your dinner is not to think, but to say to yourself "I am hungry" is a thought, because you have put together in your mind your idea of yourself, and the idea you have of that feeling which we call hunger. So, if we use the word properly the answer must be that animals can scarcely think at all, but that some of the higher animals—such, for instance, as dogs—do, beyond a doubt, act sometimes in a way which can only possibly mean that they have somehow "put two and two together" in their minds, and to do that is to think. The answer, then, is that some animals, at any rate, are capable, though only in a very small degree, of doing what we should certainly call thinking if they were men and not animals in whom we saw the results of it.

WHY CANNOT ANIMALS TALK?

The answer to this question also depends on what is really meant. We know that many animals can express something of what they feel to each other, and to us. The different cries of a baby are a kind of talk; so are the differences in the sounds a dog makes.

But as we usually mean the word "talk," animals cannot talk. Even if they imitate our words, their talk is meaningless to them. The answer to the question why this is so is that the brains of animals, even the cleverest, and such as may have lived all their lives in human company, and so have been educated as much as may be, are so vastly inferior to our brains that animals have not mind enough to enable them purposely to use special sounds with special meanings.

The throat, voice-box, tongue, and mouth of an animal are, in their way, just as good as ours. Indeed, a dog's voice takes longer to tire than most men's voices. It is the nature of the brain of the dog that prevents him from talking. To talk as human beings talk requires at least a little, though perhaps not always very much, of the special powers which the human mind alone has, and which, so far as the wonderful brain is concerned, are connected with the great size and marvellous structure of one of its parts, with which no animal has anything worthy to compare.

WHAT IS A THOUGHT?

We should always make a point of using the word thought in the strict way to mean the putting together of two ideas. "Tom is good" is a thought. It puts together the idea of Tom and the idea of goodness. We say that there is a relation between Tom and the state of goodness. "Tom is not good" is another thought,

asserting another kind of relation between Tom and goodness. So it has been said that thinking is relationing. If the relationing corresponds to the relation of the facts, then the thinking is true; if not, it is false. Of course, we cannot help asking ourselves what it is that does this relationing or thinking, whether rightly or wrongly—we all do it in both ways. Some people would say that it is your brain that thinks, but I will say that it is your brain by which *you* think.

DO WE THINK IN WORDS?

This question fits in with what we have been saying. We can think very simple thoughts, but they must really be very simple indeed, without the use of words, and to that extent animals may think, and sometimes do. They think without words just as far as we can. But this is almost nothing. Practically, all our thinking is done in words. What we must try to remember is that words are good servants but bad masters. Too many people allow words to lead them astray. Instead of words being instruments for their minds to think with, they are chains in which their minds are bound. Every word has a meaning—that is to say, it stands for something, and words are not worth anything in themselves, except, perhaps, that some of them make beautiful sounds.

CAN WE THINK WITHOUT WORDS?

There are other kinds of what is really thinking, where the things which are put together or related are not words, but something else. Some men, for instance, in doing what is called algebra, can think without using words at all. They can find out, for instance, what this means: $A + B \times A - B$. Somebody has actually written to the editor of this book asking him to have it written in figures as well as in words! Or, instead of thinking in words or figures, they can think in lines and angles and curves, and find out all sorts of wonderful things in this way. Euclid could think in this way about as well as anyone who ever lived. Other men can think in sounds. One of the greatest musicians who ever lived, Beethoven, wrote some of the most marvellous music in the world, which will be listened to as long as men have ears, long after he had become stone-deaf. He put the ideas of the sounds together in his head. He could think in notes as easily as you and I can think in words.

WILL THE SUN EVER COOL DOWN LIKE THE EARTH?

There can be no doubt that the answer to this question is yes. The sun, the earth, and the moon are all made of the same stuff, and they are all cooling down according to the same laws. The moon, no doubt, is much the coldest of these three, but that is because it is the smallest, and small things cool down much more quickly than large things, because small things, in proportion to the stuff that is in them, have such a large surface to lose their heat by. The earth is bigger than the moon, and therefore not yet so cold. The great planet Jupiter is very much bigger than the earth, and is still so hot that it probably makes a little light of its own besides what it reflects from the sun. The sun is very much bigger even than Jupiter, and so has not cooled down anything like so much. But if we study the sun, and compare it with other stars, we can be sure that the sun is cooling, and one day it must become cold.

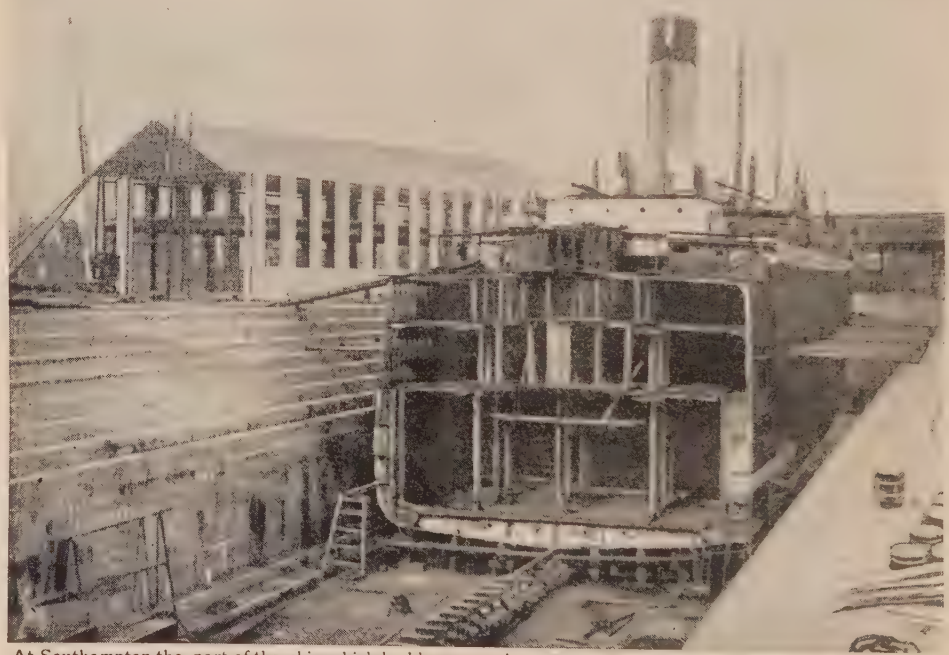
WILL OUR WORLD EVER BURN OUT LIKE THE MOON?

There can be no doubt about the answer to this question, though no one can tell how long it will take before the answer is fulfilled. Our earth must become like the moon. There will be certain differences, because the earth is much larger than the moon. The moon has been too small to hold to itself the gases outside it. It has no air or atmosphere. The earth is able to keep its atmosphere because it is bigger, and so the power of its attraction is much greater. Such reasons as this will always make a difference between the earth and the moon.

Another difference is that, in consequence of the rapid cooling of the moon, the changes on its surface have been more violent than those on the earth. The biggest volcano on the earth is nothing compared with those of the moon. But all these points of difference do not affect the fact that our earth is bound some day, though after a far longer time than men lately thought, to become cold and lifeless like the moon.

HOW HALF A SHIP WENT HOME

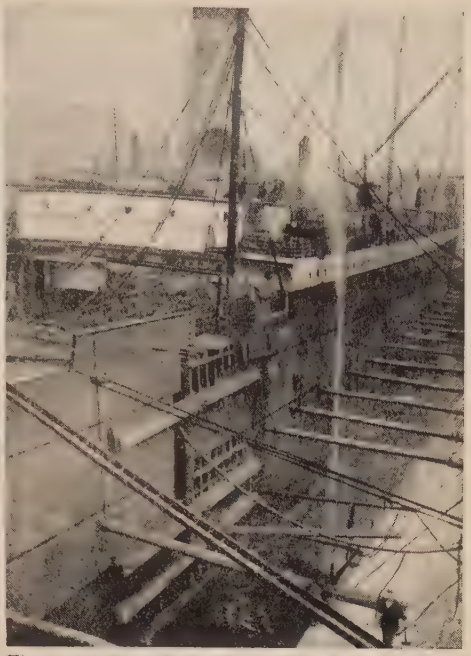
In the old days, when a ship was wrecked, that was the end of it. But here is the larger half of the great ocean steamship Suevic, afloat after being broken in two. She was wrecked in March, 1907, on Lizard Point, Cornwall, and could not float off. She was broken near the middle. Divers went to work in the water under her, and cut away the broken part, and guns were fired at the deck to free the ship from her shattered front part. Then the powerful steam-tugs towed her to Southampton, 170 miles away.



At Southampton the part of the ship which had been saved was taken into a dock. The water was run out of the dock so that men could work, preparing to join on a new front part to the steamer. The new part, called the bow, was built at Belfast, then towed over to Southampton, the voyage lasting a week

AND HOW IT WAS MADE WHOLE AGAIN

The clever workmen brought the new part into the dock to join it to the old part, and built the two together, like a builder adding a new room to a house.



The work is being finished here. The decks have been joined, the steel frame of the ship has been fastened together, and only a few steel plates have to be fixed.

When the work was finished, nobody could have told that the Suevic was not a new ship. Yet it had been to the bottom of the sea, had been raised and cut in two, and one half had been towed for 54 hours through stormy seas from the Lizard to Southampton, the other part coming from Belfast. You would never know that anything had happened to the Suevic. She is as good as new, after her experience in the ship hospital.

The photographs in these pages are by Stephen Cribb, Southsea.

WILL THE EARTH EVER BE COOL RIGHT THROUGH?

This question is just so put that we may begin to understand what a very long time indeed it must be before the earth gets cooled right through, as it is bound to do some day. If we want to cool our tea we put i in a saucer, partly because the cold saucer takes some of the heat out of it, but especially because it spreads the tea out, and so exposes it. In the same way, when we go bathing on a sunny day, we find the shallow pools on the way to the water much warmer than the water itself. Heat can get in and get out when things are exposed. But if we take a thing like a hot bottle, and wrap it up in a thick layer of blankets, it will be hot for many hours.

Now, there never were better blankets than those which the fire inside the earth is packed in. The air is a blanket very many miles thick. The crust of the earth, too, is a blanket. Also these blankets are being warmed from outside by means of the sun, and what with these facts and the fact that new heat is being made by radium, we can begin to understand that it will be many long ages before the earth is cooled right through. Yet so it must be some day. A thing may be very slow and yet very sure.

WHAT MAKES THE SUN ALWAYS HOT?

The answers we have just been reading tell us that "always" is too big a word to use of the sun's heat, even though the sun has always been hot ever since there have been men to look at it, and long before. The sun will not be always hot, nor has it been always hot. Long ages ago, before the earth and the sun were anything like what they are now, there was not nearly so much heat. The heat was gradually formed, it seems, as the great mass of cloud or nebula from which earth and sun were made shrank.

The central part of this cloud, the part which we now call the sun, has had a wonderful history, then, and we can see stars in various parts of the sky which show different stages of what has been the sun's history. It is almost certain that the sun was once much hotter than it is now; probably white hot, like the whitest of the stars. It is now yellow hot; it will some day be red hot, and then gradually become dull and dark until the light goes out of it altogether. But this will be so many ages away that we cannot possibly imagine the length of them.

WHY DO WOMEN WEAR WEDDING-RINGS?

A wedding-ring is a useful and sensible thing which anyone should be proud to wear, but we should scarcely guess how it came to be used. Most of the people who study the customs of long ago are agreed that the wedding-ring really had its origin in the days when men used to own their wives. In those terrible times, which foolish people call the good old days, men used their brutal strength to make women their slaves. Now, it is customary to put a chain upon a slave, to put something round him to show that he is yours.

After a time, as men got a little better, instead of actually putting anything like a chain on their wives, or a ring round the neck or body, they invented something which would have the same meaning without being really bad. Anything that stands for something else, like this, is called a symbol; and we now believe that the wedding-ring began as a symbol, meaning that the wife was the husband's property.

It would astonish us to learn how many of our other customs arose in this way. For instance, when people are first married, they often go away for a time, which is called the honeymoon. There is no doubt that this really remains from the time when the husband stole his wife away from her family, and took her away with him. So bad things can become harmless, as well as good things become bad. However they came into use, these things and customs are certainly useful now, so that everyone can see at a glance that a woman is someone's wife, and may treat her with the special respect that is due to a wife and mother.

WHY IS IT BAD TO SLEEP WITH FLOWERS IN THE ROOM?

The reason is a very good one. While you are breathing in the night, you are spoiling the air in your room, and if the air were not changed during the night it would hurt you. But the flowers are doing just the same thing; they also are breathing, though very much less than you are, and so they help to spoil the air for themselves and

for you. Also, cut flowers are slowly dying, and as they die they are changed, and things are given off from them which are probably not good for you. Neither cut flowers nor living plants are good to sleep with, for both of them in the dark do nothing but help to poison the air in the room. I do not say that this is very important. I would much rather you slept with your window open, and had a few flowers in the room, than with the window shut and no flowers; but still, it is worth remembering.

SHOULD WE HAVE PLANTS IN A SICK-ROOM?

The last question is about sleeping with flowers. Now, that means living with plants in the darkness. Well, the answer to that when one is well is just the same as the answer to it in the case of a sick-room. Indeed, we should be more particular when someone is ill. But this present question asks nothing about sleeping. It is a general question about "all the time." The answer, so far as the time when the room is dark is concerned, is, of course, the answer to the last question, but the case is utterly different for the daytime.

The point is not whether one is sleeping or awake, but whether the room has or has not sunlight in it. As long as there is sunlight, it is very good to have plants, and especially with plenty of green leaves, in a sick-room. They are beautiful, and that is good. Most wallpapers with patterns on them are almost enough to drive an invalid crazy; but when the eye falls on green leaves it is always soothed and cheered. But a more important reason is that the daylight acts through the green stuff of the plant so as actually to make fresh oxygen in the air of the room by breaking up the carbonic acid gas which the ill person breathes out from his lungs. Plants in the daytime help to ventilate a sick-room, or any other room.

WHY DID NOT THE EARTH BURN UP WHEN IT WAS A BALL OF FIRE?

We know that burning is the thing that happens when anything is combined with oxygen. We know, too, that many things when they are made hot will burn in this way. If these laws were true long ago, as they are now, the earth should have burnt up, as you say. Well, the answer is that the earth did burn up almost entirely, so far as the outside of it is concerned. All the sea is burnt; all the water everywhere has been made by the burning up of hydrogen, and most of this happened long ago, when the earth was cooling down from a ball of fire. Not only are seas and oceans burnt, but the land is burnt also. We cannot burn clay and rocks and stones, for the very good reason that these are the results of the burning up, or combining with oxygen, which went on as the earth was cooling down from its hottest state ages ago. Apart from things which have been made by life, such as coal, there is very little indeed of the surface of the earth that is not already burnt; and it was burnt just in the way that this question suggests.

HOW DOES A PIGEON FIND ITS WAY?

This is a deeply interesting question which has long been a puzzle, and men have made all sorts of guesses to understand how pigeons can find their way home even over long distances, when they have been carried away in a closed box through which they could not see.

Most people think now that the bird finds its way simply by seeing. It has wonderful eyes. As it flies high in the air it can see for very great distances. As a rule it flies about until it sees something it knows, and then it makes for that. Sometimes the pigeons fail; and young pigeons are not so clever as old ones, probably because they do not remember so well—for you understand, of course, that the pigeon must remember in order to find its way home, and so we know that the pigeon has memory, as we have. It used to be thought that the pigeon had a special sense, which was called a sense of direction; and there may be something in this, at any rate, in the case of other creatures. But most people now believe that the pigeon's sight and place-memory are sufficient for it. We have to realise the enormous distances that it can see when it flies high enough, and also that it does not require to see its home, but merely any place that it remembers. An old pigeon has often flown a good deal round its home, in all directions, and if it can recognise any point on these occasions, that is enough for it.

WHAT IS AN ELEMENT?

This is a question which is answered in all the books on chemistry. They say that an element is made up of atoms of a particular kind which cannot be changed or broken up or put together, whether with each other or with atoms of some other element, so as to make atoms of any other kind. This is what has been believed during the whole hundred years since atoms were really discovered by the Englishman John Dalton. When we come to inquire of any given thing, then, whether it is an element or not, we have to find out what its atoms are like, whether they are all alike, what their size is, and so on. To study an element is to study the atoms that make it up.

IS RADIUM AN ELEMENT?

The answer to this is that radium is an element if anything is, but that, as we see on page 1295, the atoms of radium do not answer to what until now we thought atoms to be. They can and do break up, forming other atoms. Yet radium is an element for these reasons: it consists of atoms that are all of one kind—unlike a compound which is made of atoms of two or more kinds; these atoms can be weighed, and we know that they weigh about 225 times as much as an atom of hydrogen; and, like other elements, radium can be shown to give out a special light which, when we study it, ray by ray, is evidently the light given out by an element, and is different from the light given out by any other thing, just as the atom of radium is different from any other atom.

Radium, then, is an element as much as oxygen or gold is, but it is now necessary for us to change our ideas of an element simply by refusing to say in future that an element is made up of atoms which cannot be changed. They can be changed, though not by us, for we cannot control them or break them up as we can break up the molecules of a compound into their atoms; but we can watch the change. Atoms, however, really exist, and so do elements, just because atoms are of different kinds. This is all true, and we were never surer of it than to-day. It is no less true because we have just learned that atoms themselves are not simple, unchangeable things, as men have believed for about a century past.

HOW DOES THE SUN PUT OUT FIRE WHEN SHINING THROUGH THE WINDOW?

At this question the Wise Man simply laughed, and said, "I do not believe a word of it!" The answer to this question is that the sun does not put the fire out when it shines through the window, and there is no reason why it should do so. The reason for this belief is quite simple. If we light a match in the open air on a bright, sunshiny day, we can sometimes scarcely see whether it is lit or not.

Now, suppose we had lit that match in the dark, and then took it out into the sunshine, it would look as if the sun had nearly put the match out; but really it is only that the light of the match cannot make so much impression on our eye when it has the light of the sun to compete with; and so with the fire and the sun. Go into a dark room where there is a fire, and then turn on a brilliant light in the room; the light of the fire will seem to turn pale and poor.

That is all that happens when the sun seems to put out the fire. It is true that the brightness of the fire depends upon its getting a good supply of air; and it might be that the sunlight in a room made the air warmer and lighter, so that the fire was not fed with quite such a good draught. But I think the explanation given is really all that we need to answer this question.

WHY DOES GLASS NOT BREAK IF PUT IN COLD WATER AND BOILED?

Perhaps if you think for yourself, and remember some of the questions we have answered already, you may be able to answer this for yourself. Almost everything gets bigger, or *expands*, when it is made hot; and it gets smaller, or shrinks, or *contracts*, when it is made cool. If, then, we take a thing all in one piece, and do not heat every part of it to the same extent at the same time—something will have to go. That is what happens when a tumbler is cracked in the way we all know; but if the tumbler is put into water, and then the water is boiled, all the parts of the glass expand equally as it gets hotter. The *whole glass* becomes bigger, but there is no strain between its inside and its outside, and so there is no reason why it should break.

The next questions begin on page 1569.

WHAT THIS STORY TELLS US

SOLOMON confessed that one of the things that he could not understand was the serpent. Some things which Solomon did not know, men of later times have learned, but the mystery of the snake still remains. Those snakes that are poisonous can, in a few minutes, kill a man or a horse, or almost any other living creature. We can cure a man who has been riddled with bullets, or who has had the most serious illness, but one sharp bite from a poisonous serpent serves to defeat the skill of the cleverest doctors. There are nearly 2,000 different sorts of snakes, but in this story it will be sufficient to divide them into two classes—those that kill by poisoning, and those that kill by crushing. Of the poisonous ones, the worst are the cobras and the vipers. Each of these can cause death. Here we read about the habits of many of these terrible reptiles, of the places in which they live, of the food they eat, and of the way in which they do their deadly work.

THE GREAT SNAKE FAMILY

CONTINUED FROM 1224

THE serpent does not sting. Bees and wasps and scorpions sting. The poisonous snake bites, and the poison is squirted through holes in its fangs into the wound which these fangs cause. Snakes do not eat oxen and other animals of that huge size. When moving along the ground they do not move in arched curves as many of the school-books show. They glide along flat on the ground, but with the body curving in zigzags, like a twisted arrow.

The snake's spinal column is made up of a long chain of bones, which fit into each other on the ball-and-socket plan. Ribs join on to these bones, and work, of course, as the various parts of the backbone work. There may be as many as 300 to 400 bones in the backbone of the big snake, and ribs for nearly all of them. Now, these bones move with wonderful ease and suppleness, but they can move only from side to side. If the backbone could twist in all directions, there would be no safety for the spinal column of the snake. The snake can twist from left to right, and it can raise the front portion of its body, not easily, but surely, into an upright position.

How does the snake move? Every pair of ribs acts as a sort of foot. The whole of the snake's body forms one long foot. Each pair of ribs joins on to a strong scale under the body of the snake, and controls it by a slender but strong muscle. It is on the ends of these ribs, hidden though they are, that the serpent rests. When it wishes to go forward, it moves its ribs in such a way that they cause its scales to stick to rough ground, or the bark of a tree. It rows along the ground, the rib-points making the scales act as oars. Therefore, it must have a rough surface upon which to travel. On smooth ice or glass the biggest snake would be helpless.

The most wonderful feat of the snake is surely its tree-climbing. It goes up a great tree-trunk just as if it had feet. Some snakes have the remnants of feet, like little spurs. Others possess in their bodies the remnants of bones which once belonged to limbs for walking. But, though the spur-like limbs may help the snake which has them, most of the reptiles depend for their climbing only upon the action of their ribs.

They rob nests of eggs and eat the birds. They hang head downwards to snap any young deer or dog that may pass. A venomous snake will not hesitate to kill a human being.

Those faithful natives who carried the dead body of Dr. Livingstone down to the coast, at Zanzibar, had in the party a little native girl named Losi. While she was carrying water one of these fearful snakes dashed at her, struck her on the leg and caused a bad wound. In ten

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minutes the poor little girl was dead. The party stopped there and buried her; then went sadly on their way.

A day or two later they were overtaken by an Arab, who told them that, while passing the same spot with another party, one of his friends had been struck by what they believed to be the same snake. The man thus attacked died almost at once. While his comrades were looking out for a place in which to bury him, they found the freshly-made grave of little Losi, and they buried the man beside her.

THE SNAKE AS LONG AS SIX MEN, WHICH HIDES IN THE BRANCHES OF TREES

There are many kinds of tree-climbing snakes. The giant boa-constrictors and pythons are expert climbers. The python is supposed to be the biggest of all snakes, but it is not. The biggest is a member of the family called the anaconda, a fearful creature, chiefly found in Brazil and Peru.

Along the Amazon and Orinoco rivers and their tributaries it is also known as "water-boa," and when full grown is said to measure forty feet or more. These giants climb trees. More frequently they are to be found in rivers, or lurking in still pools, resting on rocks, looking like fallen trees, but eagerly awaiting their prey. Out of the water they are not so agile as most snakes, but in the trees they are active and deadly. Big ones are said to seize human beings.

It is curious that the snakes which have most and best teeth do not kill by biting, while those which have fewest teeth do kill by biting. The boas and pythons kill by winding themselves in dreadful folds round their victims. The cobras and vipers kill by a bite, which opens the way for the injection of the horrible poison. How can the cobra so quickly kill its victim?

First of all it must approach. It has keen sense of smell, which enables it to detect the presence of an enemy. Next, it has the power of rapid movement, and of making a tremendous blow with its head. Its aim is sure; its bite certain. When about to strike, it raises its head, and inflates a curious hood at the back. Its tongue shoots forth from an opening in its upper lip, through which it issues from a protecting tube in the mouth. The tongue is forked at the end, and shoots in and out, quivering and darting in the most threatening way. The tongue is supposed to be the serpent's sting; but it is nothing of the sort. If it serves any part in the attack, it is simply to alarm the victim, and render him less able to defend himself.

THE TERRIBLE POISON THAT FLOWS DOWN THE FANGS OF THE COBRA

The cobra, when it launches itself upon its enemy, opens its mouth. In the upper jaw there are two teeth, and two only. These, when the mouth is closed, lie flat, like the baleen in the closed mouth of the whale. But the moment the mouth opens the two fangs stand up. They are fixed into the bone of the upper jaw, and are controlled by that jaw's movements.

When the mouth opens, the same action which sets up the teeth presses upon muscles which squeeze the poison gland. This causes the poison to flow out of the gland. The only way of escape for it is by way of the canal running through each tooth.

When, therefore, the cobra strikes, his sharp, erected teeth cause a wound in the flesh, and at the same moment the poison which is being squeezed through the tooth enters the wound. The poison enters the blood of the victim, and is carried into his system. Paralysis, suffocation, agony, and death follow.

A marvellous thing is that this poison, so terrible when pumped in through a wound, is quite harmless if swallowed. But there must be no wound on lips or tongue, for should it enter there death would be certain.

HOW A SNAKE POISONED A RAT THROUGH TWO TINY PINHOLES

Nothing else can better make us understand what cobra poison will do than a couple of bad incidents at the Zoo in London. Some years ago one of the keepers, who was foolishly taking liberties with an Indian cobra, was bitten by it. The bite of a cobra which has been for some time in captivity is not nearly as deadly as the bite of a cobra which is at liberty; but this man was dead in an hour. The next is a more extraordinary case. Here the victim was Frank Buckland, one of the most daring of naturalists. While at the Zoo he saw a cobra bite a

A SNAKE THAT CAN SWALLOW A SHEEP

Boa-constrictors are the family of giant snakes, and this is a boa-constrictor proper. It has no poison fangs. Seizing its prey with its teeth, it coils itself round it and crushes it to death. Then it eats the animal whole. The boa is one of the largest snakes, but not so large as the python. It has a kind of hook like a spine instead of a hind limb, for no snakes have real feet or arms, and do not need them. It is an expert climber of trees.

The python is one of the boa-constrictor family. It can easily swallow a half-grown sheep. The female python lays her eggs in a pile. She coils herself round them and does not move away for two months, when the eggs are hatched. Ordinarily, the blood of the snake is cold, but when hatching her eggs the python's blood is warm. If you touch a common snake, you will be surprised to find that it feels warm, not cold.

rat. The rat received one bite, and seemed instantly to know that its end was at hand. It retired to a corner with its eyes widely expanded, its mouth open, and vainly trying to prevent itself from falling. Then it sank down on to the floor of the cage—dead, three minutes after being bitten.

Now, Buckland determined to have that rat, and to see what the effect of the bite had been. He managed to get it out of the cage, and to examine it. There was not a sign of a wound outside, so he took his knife and began to skin the rat. Then he saw in the animal's side two tiny holes, like small needle-pricks. Only ten minutes had passed since the rat's death, but the flesh round about the wound had gone bad as if the rat had been long dead.

Buckland scraped away at the skin where he thought the snake's teeth had entered, using his thumb-nail for the purpose. Suddenly he felt a terrible pain, as though somebody had struck him a heavy blow on the head and neck. At the same time he felt an acute pain in the chest, as if a red-hot iron had been run in, and a weight pressed upon his heart and lungs.

HOW THE SNAKE'S POISON FROM A RAT'S BODY NEARLY KILLED A MAN

Buckland knew that he had been poisoned by the venom injected by the cobra into the rat.

He said to a friend who was with him, "Keep me going; take me to a druggist's." Poor Buckland became almost unconscious; but, with his friend's help, he managed to reach the druggist's, and to take down a bottle of hartshorn. Of this he drank a large quantity in a tumbler, with a little water added. It badly burnt his mouth and lips, but as he felt immediate relief he did not mind that. It saved his life. For weeks afterwards he was very ill, but in time he got better. It was only a mild attack of the poison which he had had to bear.

Of course it remains to be told how he managed to get poisoned at all. He had not touched the snake, and the poison is harmless unless it enters through a break in the skin. And that is just what had happened here. Before going to the Zoo, Buckland, in cleaning his nails with a sharp instrument, had forced a tiny part of the skin away from the place at which it joins the under part of the thumb-nail. It was that nail which he had used to scrape the skin of the rat where the snake's fangs had entered. And through that tiny crack in the skin of his hand the dreadful poison had entered, and nearly caused his death. The poison had been in the body of the rat, yet, passing by the small opening into the hand of the man, the least drop of it all but killed him.

EVERY YEAR SNAKES KILL ENOUGH PEOPLE TO MAKE A GOOD-SIZED TOWN

There are several sorts of cobras. India has two sorts, Java and Borneo have another sort, and Africa has three or four sorts. The giant cobra of India measures as much as 13 feet in length. The ordinary cobra averages about 6 feet in length, though specimens have been killed more than $7\frac{1}{4}$ feet long. The Egyptian asp, of which we read in the Bible, is a cobra, which has spread far over Africa.

The death-rate from snake-bite in British India alone varies from 18,000 to 22,000 a year, to say nothing of thousands of cattle killed in the same way. A cobra cannot eat a horse or a cow, but it can give it a bite sufficient to cause its death. The death-rate does not go down. In 1905 the number of persons killed by snakes in India was 21,797, but in 1906 rose to 22,854.

Thousands of snakes are killed every year, but not nearly as many as there should be. For a long time the British Government paid a reward for every snake killed in India. In 1880 over a quarter of a million were killed, and the number went on growing, until in 1889 the number slain was nearly 600,000 in the course of the year.

THE WICKED TRICK OF THE INDIAN SNAKE-CHARMER

But wicked natives managed to keep poisonous snakes in order that they might breed, so enabling the men to kill a certain number and claim the reward for them.

That brings us to an interesting feature of Indian life. In many parts of the world natives worship snakes. They worship anything that is terrible, believing that if evil is powerful, we must be polite to it. They put up temples to cholera in some parts. Well, as many people worship serpents in

SNAKES THAT CAN KILL MEN INSTANTLY

The Indian cobra squeezes poison through holes in its two upper teeth into the flesh of its victim, and causes almost instant death to man or animal.

Like its relative in India, the African cobra has only two teeth in its upper jaw, but each of these makes a wound, and then injects the deadliest poison.

The anaconda is the giant boa-constrictor. There is one in the British Museum measuring 29 feet, but in the wilds the anaconda is said to reach 40 feet. It lives chiefly in water, and is not active on land, but it climbs trees with extraordinary speed and sureness. It is said to attack human beings when very hungry.

India, naturally they dare not have them killed. Clever, wicked men pretend to charm the deadly cobra. They say that by playing musical instruments they can charm a snake from its home.

What they really do is to produce a snake from their own garments, where they have secretly hidden it, and say that that is the wild one. They do not kill any of the snakes they show. Declaring that they have a charm which prevents the snake from killing them, they say that the charm would depart from them if they killed a cobra. "I will take this one away from you and release it in another jungle, far away," they say. They do exercise some sort of control over their own snakes, but it is the result of shameful cruelty.

When they catch a cobra they throw a cloth to it. The snake fixes its hooked teeth in this, and before it can draw them out the native gives a sharp tug at the cloth, and breaks off the poison fangs. The snake itself often breaks these, but they grow again very rapidly.

THE SNAKE THAT GREW NEW FANGS AND KILLED ITS KEEPER

Now, while the snake is defenceless, the native takes a red-hot iron and burns out the gland in which the poison is stored. After a burn such as this, flesh cannot grow again, so the poison cannot again collect. With the poison gone, though the teeth may grow, and though the snake will again and again bite its master, it cannot hurt him. This is the explanation of the so-called snake-charming of which we read.

Of course, the Indians always pretend that their snakes are deadly. They are the cleverest jugglers in the world, and can play all manner of tricks which the innocent do not detect. But sometimes they do not quite clear out the poison from the snake's mouth, and there comes a day when he is able to give a bite which kills the cruel pretender. This mistake once led to a death at a Zoo. Some snakes were brought there by a man who pretended that they were harmless, that he had mastered them. But after he had gone away the poison fangs grew again, and the poison gland was in full working order, and caused the death of one of the keepers of the snakes. As we all know, however, it is not only the largest snakes which are poisonous; some, as we have seen, which are very large are not poisonous. But there are deadly ones among the lesser snakes. The coral snakes are some of the handsomest of these. They live in America, Australia, Asia, and Africa, and though avoiding the homes of men, they are able to make very ill, or kill, any person they bite.

THE SNAKE THAT CREEPS INTO HOUSES IN INDIA

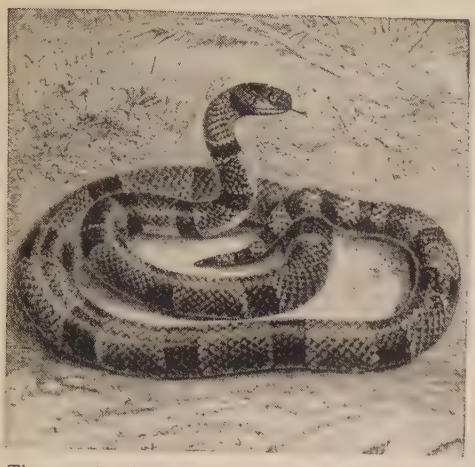
There is a rather similar snake, called the long-glanded snake, which ought to be even more terrible, for in this the poison gland is not confined to the mouth, but actually runs from the back of the head, along each side of the body for a third of its length. Happily, its total length is not much more than two feet. Closely related is the family of craits, which includes eight species of poisonous wretches, among them the banded adder of India, which is also called the king snake. The latter, though much to be feared—it can kill and eat a cobra—keeps clear of men. The ordinary crait, however, is the one which, next to the cobra, takes most lives in India. It creeps into houses, and the moment it is disturbed it gives its fatal bite.

New Zealand has no snakes, but Australia has enough and to spare. One of the most common is the horrid death adder. Although it feeds on frogs and young birds, it will savagely attack a man, and its name sufficiently tells its character. Many snakes live entirely, or nearly all their lives, in the water. Most of them prefer the fresh water of rivers, but others live in the sea. These are all poisonous, and woe betide the poor Hindu who ventures into the sea where they are seen to swarm. Their food is fish, but they will attack human beings.

THE ONLY SNAKE THAT ONE NEED FEAR IN GREAT BRITAIN

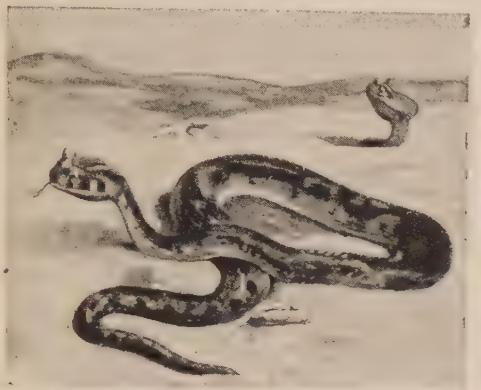
Europe has but one poisonous snake, the adder or viper; and this occurs in England. Otherwise England has only one common snake, which is much like the common American water-snake. It is called ringed or grass snake there. It is quite harmless, though it may attain a length of from 3 feet to 4 feet. It eats frogs, mice, young birds, and other little animals, and small fish. As it eats fish, it is plain that the grass

SNAKES THAT CLIMB TREES & HIDE IN SAND



The most handsome snakes are frequently the most venomous. This is true of the coral snake, seen here, which is one of the most beautiful, but very deadly.

This new snake or grass snake is the only British serpent. It is quite harmless, eating insects, frogs, fish, birds and eggs, and swims well.



This horned viper is common in Egypt and other parts of Africa. Burying itself in sand, it leaves only its head visible, ready to bite. Its venom is deadly poison.

The puff-adder, here shown, can fill itself with air and look horrible. Savage huntsmen in Africa use its poison to tip arrows for killing men or animals.

The rattlesnake is the most terrible of the viper family. At the end of its tail is a bunch of horny rings, and it is the curious rattling of these that gives the snake its name.

The banded sea-snake, seen here, lives chiefly in the sea and tidal waters round the coasts from India to China. It has a broad tail, which enables it to swim fast.

snake must take to the water. It does. It is an excellent swimmer, and likes a great deal of water. Most snakes do. They would die without water, unless they could go to sleep. This does not apply, however, to the cobra, which can fast like a toad, and go for a long time without drinking. But let us go back to the English poison snake, the viper.

In England and Scotland, where it is fairly common, it likes dry heaths and waste places, hiding under stones and brushwood. Sometimes quite large ones are found, but, generally speaking, the viper does not exceed a length of about 24 inches. It eats frogs and birds, killing them with its poison, then swallowing them whole. The viper will not attack us if we do not first interfere with it. But one may touch it by accident; then it will strike with its fangs, and the result is a wound which causes great pain and swelling, followed often by a serious illness. The danger is that the viper may be taken for the harmless green snake. Once a boy, who caught a snake which had been robbing a nest, carried it home, and played with it while it was sleepy, believing it to be harmless. Suddenly it bit him, and for weeks afterwards he suffered greatly.

How the little wild Bushmen of Africa poison their arrows

It makes us fear the viper more to know to what a deadly family it belongs. The sand-viper of Europe, the chain-viper of India, which kills human beings and destroys cattle by biting them in the nose, and the horrible puff-adder of Africa, the ugly monster which, when angry, fills itself with air so that it swells visibly—these are some of our viper's relatives.

The puff-adder is interesting from the fact that it is its poison which the little wild bushmen of Africa use for their arrows. They are very small arrows, so small that they would not kill a deer. But when they prick the flesh they startle the deer, which, feeling the wound, runs away. By running, it causes the blood to spread the poison over its body. It soon falls dead. The hunters eat the flesh, and are not hurt by the poison.

Snakes have not much brain, but one of them, the horned viper of Egypt, a savage-looking snake, which has two short, sharp horns, has sense enough to know that, where a caravan has been, another will go. It curls itself up in the footprint of a camel, and waits for some other animal to pass, ready to shoot out and inflict a fatal wound. Bad as these are, we have yet to come to the most dreaded of vipers, the rattlesnake.

The mystery of the rattlesnake's wonderful tail

The rattlesnake is the head of a family of what are called pit-vipers. Not because they live in pits, but because they have a deep mark or pit on the head, do they have this name. Some live in Asia, but the most deadly are those of North America. The rattlesnake is not among the biggest of snakes, for it does not exceed 4 feet in length. Even so it is a fearful creature. One bite will paralyse a man. Its natural food consists of rabbits, rats, mice, frogs, and prairie dogs. We have read about the rattlesnake making its home with these little creatures.

The most curious part about this snake is its rattle. This, in an old snake, consists of about twenty round rings of a quill-like growth, loosely formed at the end of the tail. What purpose it serves nobody can say. Under excitement the rattle is raised and shaken. Animals know the sound and are afraid of it. Whether it is meant to terrify the prey of the rattlesnake and make them helpless, as the roar of the lion is meant to frighten the deer, or whether it is meant to drive away creatures with which it is too lazy to do battle, or whether it is the way of the rattlesnake for communicating with his fellows—we do not know. If a rattler shakes his tail, all his relatives in the neighbourhood shake theirs in answer.

Rattlesnakes that came together to sleep through the winter

Pigs have done a great deal towards keeping down the numbers of rattlesnakes. They do not seem to mind its bite, nor the bite of the deadly cobra. Though bitten two or three times, pigs munch away and enjoy the snake like the greatest dainty. But in days which living men can remember, rattlesnakes swarmed in certain parts of America. They used to collect in enormous numbers, and, coiled in masses, thousands of them would thus sleep the winter away. It is said that, in order thus to meet, some of the snakes

SNAKES THAT MEET FOR A WINTER'S SLEEP

The viper is the only poisonous snake in the British Isles. The average length of the full-grown ones is 24 inches, though larger ones are sometimes found. The bite of the viper causes serious illness. If the fangs touch the victim's neck, the wound may cause death by suffocation. In winter vipers gather together in numbers.

The ringed snake, seen in this picture, is harmless to men. It neither poisons nor crushes. It loves the water, where it catches frogs and other small water animals. These it seizes by the leg, then swallows them whole.

would have to travel twenty or thirty miles. It was a case of returning to their birthplace, and they went as surely as birds which migrate.

THE SNAKE WITH A MOUTH THAT WORKS IN TWO HALVES

All snakes have some features in common. They have not movable eyelids like lizards. They all change their skins frequently in the course of the year. They all have a skin covering to the eye to protect that organ from injury by thorns. But the most striking thing is the way in which their mouths are formed. The lower jaw, instead of being one bone as ours is, consists of two halves joined together at the chin by a tough muscle. The effect of that is that the snake, when eating, can grip with one side of its mouth, while the other is opened and moved forward.

When a snake seizes an animal with its teeth, it must hold on—it cannot afford to let go. Their teeth, of which there are three or four rows, all curve towards the throat, so that there is no escape, once an animal is seized. But, holding with one half of the jaw, the snake can, by moving first one side of the jaw, then the other, draw the animal down its throat.

The power of their jaws, throat, and body to stretch is wonderful. No snake can masticate its food ; it must swallow it whole. When the meal happens to be a sheep, or a small deer, or a big dog, we can understand that the stretch must be considerable. We do not know quite what the python can swallow. One is said to have been found dead with a full-grown goat inside it, its death having been caused by the animal's horns. On the other hand, it is said to be impossible for the boa to swallow anything bigger than a half-grown sheep, and this is nearer the truth.

HOW A BOA-CONSTRICTOR TRIED TO CRUSH AND EAT THE MAN WHO FED IT

That the boa-constrictor will *try* to eat men we have evidence.

Once when a man was about to feed a hungry boa with a chicken, the reptile, in darting for the fowl, missed it, and by mistake caught his hand. In an instant the terrible creature wound itself round his arm and neck and threw him down helpless. He could not move, but two other keepers rushed up, and by great exertions got the man away, but not until they had broken off the snake's teeth in the man's hand and so released him.

That gives us an idea of the power and ferocity of these monsters. Having once seized their victim, they fling their great coils round him, and by the most terrible power crush him, bones and all. A bear may hug, but it cannot hug like a great python can crush. Of course, they reach a great size. The Indian python grows to 30 feet, and the West African python to 25 feet, and their bodies are as thick as the thickest part of a man's leg.

The boa family includes the python, the anaconda, and the boa-constrictor proper. They all climb trees and can hang head downwards by the aid of tails, which, like those of the American monkeys, have gripping power. They show the rudiments of what once were hind legs. They are less feared than the poisonous snakes, because they will not, as a rule, attack men unless very hungry. One at a Zoo swallowed a rug, when waking after a long fast.

THE SNAKE THAT ATE ITS BED-FELLOW IN THE NIGHT

This reminds us that once the boa strikes its teeth into anything it must go on eating. There was an extraordinary example of this in 1894 at the London Zoo. In a cage were two boa-constrictors, one 11 feet long and the other a little over 9 feet long. The keeper put in a couple of pigeons overnight, and before he went away he saw the larger snake take one.

In the morning there remained only the larger snake, looking enormously swollen. The 9-feet snake had disappeared ; its mate had eaten it. This is the explanation : The larger snake, having eaten its own pigeon, saw the second pigeon sticking in the mouth of the smaller snake. It made a grab, but caught the head of the snake as well.

Its teeth became fixed, and it could not get the other snake out of its mouth. So it quietly settled down to make a meal of its bed-fellow, and when morning came there were two snakes in one. For 28 days the snake ate no more. Then it woke up, and, as if to show that its appetite was in no way injured, it ate a plump pigeon.

The next Nature Stories are on page 1423.

WHAT THIS STORY TELLS US

WE have been studying living cells that swim in water, and here we read about living cells that swim in our blood, and can live in a drop of blood apart from us for days. They help to make the blood the most wonderful fluid in the world. They give us our colour—we cannot blush without them or without the iron which makes them red. These cells are made inside our bones, and they carry the air we breathe from the lungs to every part of the body for its life. Then each cell, having given up its burden of oxygen, returns to the lungs for another load, and so on it goes, round and round, until in a few weeks it is worn out and dies, and a new cell from the bones takes its place. In a single drop of blood there are more of these cells than there are people in New York City.

THE RED CELLS OF THE BLOOD

CONTINUED FROM 1183

WE have been talking about living cells, which are the units of all living creatures, just as atoms are the units of the elements of matter. We have read of some of the simplest of these living cells, those which are complete creatures in themselves, such as microbes, the amœba found in ponds, and so on.

This prepares us now to study the most wonderful fluid in the world—the red blood which is found in the bodies of all the higher animals, and which we know so well in ourselves. Though we think of the blood as a fluid, it is really crammed with living cells, red and white, upon the health of which our own health depends.

In any case, we cannot know too much about the blood. Its health is our health. The number and life of the cells in it are urgent matters for us. We eat in order to keep its fluid part of proper composition, so that it shall be able to supply the right kind of nourishment to every part of our body—from the brain-cells down to the cells that make our nails.

The gaseous part of the blood is a matter of life and death for us. We breathe in order that its composition shall be kept right—in order that the poisonous gases produced by the body and carried by the blood shall be got rid of; and in order that the life-giving gas, oxygen, shall be supplied to it in proper quantity. All these three parts of the blood—the cells, the fluid, and the gases—are absolutely necessary for life. But here, since we have been lately talking about cells, we may begin with them. On the whole, we may say that these cells are of two kinds, known as the red cells and white cells.

The red cells are much the more numerous and the easiest to understand. In a volume of blood the size of about two pins' heads, there should be millions of these red cells. That will give us some idea of their tiny size. We could also count the number by taking a very small drop of blood, dropping it into a little well made in a glass plate, and covering it up and looking through the microscope. We know exactly how deep the well is, and the floor of it is ruled in both directions with tiny lines of which we know the distance apart.

So if we count the number of cells we see in each of these squares, we can reckon the richness of the blood in cells. This takes a very long time and is very difficult to do, especially as the blood has to be diluted first; but it is very well worth doing, both for the red cells and the white cells, because their number changes very much in different states of health, and very often the doctor knows how to treat a patient just because he is able to watch these changes in the number of cells in the blood.

All the colour of the blood is due to the red cells. When we look at a single

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cell by itself, however, it is not really red, but yellow. It is the great number of them seen together that makes the blood look red.

When you prick your finger, the drop of blood should be of a rich red colour, but in people who are living unhealthy lives or who are not quite well the blood is often too pale, and these people suffer in many ways in consequence.

THE CELLS THAT MAKE OUR BLOOD RED, AND THE WAY IN WHICH THEY WORK

Breathing bad air is one of the chief causes of this paleness, for the bad gases in the air are poisons to the red cells, and kill many of them, so that their numbers may fall to perhaps much less than half of what they should be. Also the number of cells may be quite up to the mark, but they may not contain the right quantity of the yellow or red stuff which it is their business to carry about. The red cells are round and flat, and rather thinner towards the middle than towards the edge. When a thing is scooped out in the middle, it is said to be *concave*, and when it is scooped out on both sides it is said to be *bi-concave;* if it is rather flat it is called a *disc*. So we say that red blood-cells are *circular bi-concave discs*. Indeed, in shape they are rather like the glasses which short-sighted people have to wear in spectacles.

When the blood is healthy the red cells are all of the same size and shape. We cannot see any nucleus in them. But each cell had a nucleus when it was younger. When they are grown up, so to say, they lose their nucleus; they cannot divide into two, as many cells do, and they only live a short time in the blood—perhaps a few days or weeks. Then they are broken down and disposed of. This is going on all the time, and all the time new red cells are being poured into the blood.

THE LIVING PILLARS OF OUR BODY AND THE WONDER THAT WORKS INSIDE THEM

They are made inside our bones. This is one of the astonishing things which many people find it hard to believe; they think of bones as hard, dead things which exist merely for the same reason as the pillars of a building.

But these are living pillars, and the inside of them is filled with stuff called marrow, which is not only alive, but one of the most alive and most active tissues in the whole body. The cells in this red bone-marrow, as it is called, have the amazing power of making the red cells, which the blood picks up as it pours through the bones, and which keep it always freshly supplied with cells; unless, indeed, the red bone-marrow falls ill, as it sometimes does. I think there is nothing, perhaps, which upsets the red bone-marrow so certainly as having to breathe impure gases brought to it by the blood because we have been breathing foul air.

As the blood flows in our bodies, the red cells are whirled along with it, but they do not move of themselves; they are very passive things, as different as can be from the white cells. They do not change their shape; indeed, they seem to have an elastic covering which prevents them from doing so. They never eat up a microbe or an enemy in the blood. Sometimes we do see microbes in them, but that is because the microbes have killed the cells, not because the cells have eaten the microbes.

THE LITTLE CARRIERS OF HÆMOGLOBIN, THE COLOURING MATTER IN OUR BLOOD

What, then, is the use of the red cells which exist in such billions and billions in our blood? The answer is that their use is simply as vehicles, as carriers of the precious colouring matter they contain. This yellow or red matter has a long name, but it is so important that we must try to learn it.

Its name is *hæmoglobin*—the first half of this word is simply the Greek for blood. Hæmoglobin is probably the most remarkable chemical compound in the whole world. It is believed also to be much the most complicated. Indeed, the various compounds that we get when we split it up are themselves quite as complicated as any other compounds we know. We have learned in another part of this book that such a compound as water consists of molecules, each of which is made of three atoms. It is probable that there are at least a thousand atoms in every molecule of hæmoglobin. They are mostly atoms of carbon, hydrogen, nitrogen, and oxygen, but one of them—and it is absolutely necessary—is an atom of the metal iron.

So hæmoglobin follows the rule that the compounds of iron are usually coloured. It is interesting to remember that, just as iron is necessary for the

most important coloured compound in the animal body, so iron is always found in the most important coloured compound in the vegetable body.

THE IRON THAT MAKES BLOOD RED AND GRASS GREEN

That is to say, iron is one of the things that help to make colour in the world—not only the red in our blood, but the green colouring matter of leaves. It may be, then, that very humble forms of life can exist without iron, but at any rate we are certain that iron is necessary for all the life of higher animals and plants. This tells us something about our food, too. The red cells, we learned, die, and are broken up after a time, and their iron is lost. Iron is therefore a necessary part of our food; we should die without it. And perhaps it is interesting to know that the foods which contain iron, and from which we get it, include the best of all our foods, such as milk, eggs, bread, meat, potatoes, peas, rice, and oatmeal. The wines which are supposed to be rich in iron, and used to be ordered for this purpose, contain extremely little—nothing like so much as is found in these common foods; and when anyone's blood is poor in iron, milk is worth all the wine in the world for him.

But we have not yet said why this hæmoglobin should be so important. We know that it is important, since our bones are filled with material for making it, and since the blood is crammed with cells to carry it, and since we fall ill at once if the amount of it in our blood falls below the proper quantity.

HÆMOGLOBIN CARRIES THE OXYGEN TO EVERY PART OF THE BODY

It must have some great use, then, and it certainly has, for it is this hæmoglobin that carries the oxygen, which we get from the air when we breathe, to every part of the body. We have learned that every living cell must breathe or die; every living cell of the body must get oxygen or die, and the only way in which it can get this oxygen is through the blood, and the only way in which the blood can supply it is by means of this hæmoglobin. Now, what we have already learned will help us to understand what hæmoglobin does.

We must understand, in the first place, that the blood is always circulating through the body, and in the course of doing so it passes through the lungs. Every few minutes—some say four minutes—every red cell in the blood passes through the lungs, and after doing so it goes to various parts of the body, and so on, again and again, until its life is ended and a younger cell takes its place. The whole meaning of its passing through the lungs is that there it finds oxygen. Perhaps it also finds many foul gases which injure it. But that is not its fault, but ours. It is to get oxgyen that it goes to the lungs, and if we there expose it to poisons which we have breathed by our foolishness, so much the worse for the red cell, and for us, whom it is trying to serve.

Now, the special point to note is this: that the fluid part of the blood, and the white cells of the blood, cannot take up, as they pass through the lungs, anything like sufficient oxygen for the needs of the body. It is only the red cells that can do this, and it is only because of the hæmoglobin in them that they can do it.

WHAT GOES TO THE LUNGS WHEN WE BREATHE

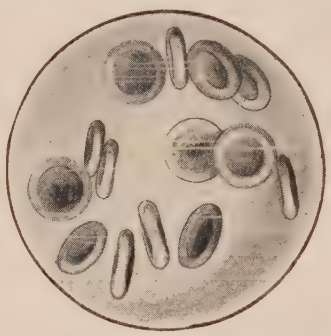
Sometimes there are plenty of them, but they do not contain enough hæmoglobin, and then we suffer. Each molecule of hæmoglobin has the power of combining with itself a molecule of oxygen. Now, no one knows the exact composition of hæmoglobin, but let us, for convenience, give it a name of its own, Hb. We cannot call it H, because we know that that stands for hydrogen. Now, a molecule of oxygen will be represented by O_2. Well, when blood passes through the lungs, all the Hb of the red cells combines with the O_2 in the lungs, and makes a compound which we can call HbO_2. This is simply hæmoglobin and oxygen, and the long name for it is oxyhæmoglobin. In contrast with this, we sometimes call hæmoglobin, when it is not combined with a molecule of oxygen, or when that molecule of oxygen has been taken away from it, *reduced* hæmoglobin. We remember that when oxygen is taken from anything, that thing is said to be reduced.

What comes to the lungs, then, is reduced or simple hæmoglobin—Hb; what leaves the lungs is HbO_2. This makes a remarkable difference of colour in the blood, for HbO_2 has a bright and cheerful red colour—the colour of life, as it has been called; while Hb itself

has a much darker and more sullen colour. We can see the difference at once in anyone who has a choking fit, for his skin becomes dark and purple. All the blood in it is full of Hb instead of HbO_2, because he is not getting air into his lungs. When he gets right again the healthy colour will return, owing to the air getting into his lungs, and the blood in his skin has plenty of HbO_2 in it instead of having only Hb.

LOOK AT THE BACK OF YOUR HAND AND SEE THE BLOOD RUNNING

If you look at the back of your hand or at the front of your wrist you will see little blue lines. These are veins, and the blood in them is running up the arm. You can tell that it is doing so, for if you hang your arm down and run your finger firmly along one of these veins, say, on the back of your hand, running your finger downwards towards the fingers, the blue line disappears. Then, if you take your finger off, you can see the blood run upwards and fill the vein again. The vein looks bluish through the skin because the colouring matter in the red cells of the blood is of the dark kind; it is Hb, not HbO_2; and this blood is rushing back up your arm as fast as it can in order to get to the lungs, where it will find fresh oxygen which you are breathing in to get ready for it at this moment; and there the Hb will be made into HbO_2, and the dark blood will turn bright again. This bright blood returns to the heart, and is pumped by it to every part of the body, where its business is to give up its oxygen so that the HbO_2 is reduced to Hb again, which is sent back to the lungs for more oxygen, and so on.



These pictures show us what the red cells of the blood are like, very much enlarged. The tiniest drop of blood appears like this under the microscope, with more of these cells than there are people in Chicago. As they die the red cells move and string themselves together like beads, as in the second picture.

The most wonderful thing about hæmoglobin, then, is its power of picking up oxygen very easily, on the one hand, and of giving it away again very easily, on the other hand, wherever it is required. That is the whole duty and purpose of these countless red cells in our blood.

If we are to be well and strong, and useful and happy, we must have a sufficient supply of red cells in our blood, and they must contain sufficient hæmoglobin. So we must avoid anything that poisons them, or that poisons the bone-marrow which makes them, and so prevents it from supplying them to the blood quickly enough. I think that bad air is much the most important of poisons we are at all likely to meet in this country. But in great areas of the world much the most serious poison of the red blood-cells is the tiny living creature which causes the disease malaria. Certain kinds of mosquitoes carry this creature, and, when they bite us, pass it into the blood, where it kills many of the red cells. We are beginning to abolish this disease by killing the mosquitoes that carry it.

WHY IT IS THAT MEN DIE IF THEY SWALLOW POISON

The action of many poisons is due to the fact that they interfere with the work done by hæmoglobin. Prussic acid, for instance, unites with the hæmoglobin in the blood so that it can no longer take up oxygen, and a person poisoned with prussic acid therefore dies of a kind of suffocation. The blood passing through his lungs cannot pick up the oxygen in them. Alcohol also has a very interesting action on the red cells. Somehow or other it makes the union of hæmoglobin with oxygen much more stable than it usually is. The consequence is that it is not reduced by the tissues of the body as quickly as should be. They are thus not burnt up so well, and this is one of the reasons why people who take too much alcohol are apt to get stout. No one knows why alcohol does this.

The next part of this is on page 1441.

THE HISTORY OF OUR LAND

George Washington delivering his first address as President of the United States

BUILDING THE NEW NATION

CONTINUED FROM PAGE 992

WE have already read that Cornwallis surrendered his whole army to the combined French and American armies at Yorktown on October 19th, 1781; and that everybody except King George III felt that the colonies must have their independence. He was stubborn, however, and peace was not made at once. He even declared, after he had been shown that the British could not conquer the colonies, that, at least, the state of Georgia and the cities of New York and Charleston, which were held by British troops, must be kept. General Wayne soon drove the British army out of Georgia, and the Spaniards took Florida, and the obstinate king was forced to agree to a peace.

SPAIN AND FRANCE WISH THE TERRITORY OF THE UNITED STATES KEPT SMALL

This peace was not made at once for the interests of Spain and France had to be considered. The chief reason France helped the colonies was the hope of harming England, and the French government did not wish to see the new American nation become too powerful. So the chief minister suggested that all the country between the Mississippi and the Ohio rivers — now Ohio, Indiana, Illinois and the states north of them — should remain an English possession. The country south of the Ohio and east of the Mississippi, — now the states of Kentucky, Tennessee, Alabama and Mississippi, — should be Indian territory, a part under protection of the United States, and a part under Spain. As Spain controlled Florida this plan would have given the thirteen states no room to grow.

The Americans who had been sent over to make peace would not agree to such a plan, and at last, November 30th, 1782, a treaty was agreed upon, though it was not signed until September 3d, 1783. This treaty gave to the United States all territory held by England east of the Mississippi River, and gave the priv-

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ilege of catching fish on the coast of Newfoundland. On the other hand the United States agreed that all debts due British merchants must be paid and that Congress would recommend to the states that they should not pass harsh laws against those Tories who had not been active against the American cause.

THE TORIES ARE HARSHLY TREATED AFTER THE WAR

The states did not pay much attention to these recommendations, and many Tories left when the British troops sailed away. Many others were forced to go later, and some historians say that about 100,000 in all left the colonies. Some of these were bad men who had done much harm to their neighbours. Others had honestly believed that Parliament was in the right and during the Revolution had gone about their business. The colonies needed population so badly that it seems a great pity that the good as well as the bad Tories were forced to leave.

WASHINGTON RESIGNS AND RETURNS TO HIS HOME

As soon as it was certain that peace had been made, the army which had been in camp near Newburgh, New York was disbanded November 3rd, 1783. On December 4th, Washington met his officers in Fraunces's Tavern, which is now owned by the City of New York. After bidding them farewell he was rowed across the Hudson to New Jersey as we see in the picture on page 993. When he reached Philadelphia, he handed to the proper officer, a statement of the money he had spent out of his own pocket after he took command of the army in Cambridge, more than eight years before. The amount was $64,315. For his services during that time he refused to receive any pay. When he reached Annapolis, Maryland, where Congress was then sitting, he resigned as commander of the army and hurried away to spend Christmas at Mount Vernon. He had seen his home but once during the whole eight and a half years, and was anxious once more to devote his time to his family, his slaves and his lands. We shall see, however, that he was not long allowed to remain at his beautiful home.

Now that the colonies had become independent states, what sort of government did they have? You remember that in the beginning of the Revolution, delegates from the states met and called themselves the Continental Congress. This body raised an army, borrowed money and conducted the war, but no one could say how many or how few its rights were. Soon men began to feel the need of some sort of union, and a committee drew up a paper called the Articles of Confederation. Congress adopted them in November, 1777, and sent them to the states to be adopted or rejected. The states were very slow and not until March, 1781, — when the Revolution was almost over, — did all the states agree.

WHAT WERE THE ARTICLES OF CONFEDERATION

In order to understand our government now, we must understand what sort of a government we had under the Articles of Confederation. The states kept nearly all the power and the Confederation had little. Now we all know that the United States is above any one state, but it was not so then. There was no president. Each state sent not less than two and not more than seven delegates to Congress, and each state whether large or small, had one vote. If a state had two, four, or six delegates present and half were on one side and half on the other, the state lost its vote. No law could be made unless nine states voted in favour of it, and so very few laws were made.

Congress was given power to raise an army and build a navy, but was given no power to raise money to pay for them. It could only recommend that each state pay its part of the money needed. The states were jealous of one another and very often refused to pay what was asked, saying that the amount was more than their share, and Congress could

not make them pay. Now a government which has not the power to raise money is almost the same as no government at all.

After peace was made conditions grew worse. During the war the danger made the states agree sometimes. When the war was ended, they quarrelled all the time. The army was not paid, and some of the officers wished to make Washington king. In Massachusetts, there was a little war known as Shays' Rebellion and in other states men refused to obey the state laws.

More curious ideas about trade

Now every state and every city is glad to get as much trade as possible. Then the old ideas of trade about which you have been told on page 978 were believed. The people in New York thought that because people from Connecticut and New Jersey sold wood and food in New York City, that they were enemies who carried off the money from the city. So they laid heavy taxes on everything coming from those states, and those states in revenge refused to trade with New York at all. Then too the territory west of the Alleghany Mountains was claimed by several states and they quarrelled about that.

Truly the United States was "one nation today and thirteen tomorrow." The wisest men began to despair. There was danger that civil war would break out, and then one by one, the states would be brought under the power of England or of Spain, for the latter nation was hoping to join Georgia and South Carolina to Florida, and had also refused to allow American boats to float down the Mississippi into the Gulf of Mexico.

It was seen that something must be done quickly, and early in 1787, Congress decided that a convention to change the Articles of Confederation should be held. The convention met in May, 1787, in Philadelphia, in the same room where the Declaration of Independence had been signed. Many great men were members and Washington was chosen to preside over the meetings. Some of the other members were Benjamin Franklin, James Madison and Alexander Hamilton. They had met to patch up the old confederation but at once they began to talk about a new form of government in which the people instead of the states should rule.

The attempt to form a stronger government

At once the delegates were divided into a small state and a large state party. Virginia then had the largest population, and she felt it unfair that her population and size should give her no more voice than Dela are, Rhode Island or New Hampshire. The small states feared that the large states would oppress them and said that the old plan of one vote for every state must be continued. Finally it was agreed that Congress should be made up of two branches. In the one, called the Senate, each state, whether large or small, should have two members. In the other, called the House of Representatives, the states were to have members according to their population.

Then the delegates disputed about the powers that Congress should have. Some did not want a strong central government; others wished a monarchy or something very like it. One man said that the old state lines ought to be wiped out and thirteen new states of equal size ought to be made. The farming states wanted one thing, the shipbuilding states, another. The slaveholding states had one idea; the states where there were few or no slaves had another. Some wished a president to hold office for life; others wished the office to be held by a committee of seven.

The constitution is finally adopted

At last, after four months of discussion, the Constitution was adopted and sent by Congress to the states to be voted on, with the agreement

that the new government would begin when nine states had agreed. It is said that Franklin, when the convention broke up, pointed to a picture of the sun in the hall and said "As I have been sitting here all these weeks, I have often wondered whether yonder sun is rising or setting. But now I know that it is a rising sun."

When the Constitution was sent to the states, many prominent men tried to get the different states to vote against it. Patrick Henry and Samuel Adams, who had done so much to bring on the Revolution worked against it because they were afraid that it took too much power away from the states. They and many others feared that the president would become a tyrant. But the friends of the new form of government were too strong. Delaware first approved and was followed by Pennsylvania, New Jersey and then by all the other states except North Carolina and Rhode Island. These two states did not join the new union until the government was well begun.

A PRESIDENT IS ELECTED

When the time came to elect a president, there was only one choice for the head of the new nation. Washington was again called from Mount Vernon to serve his country. He was supposed to begin his administration on the first Wednesday in March, 1789, but not until April 30th, 1789, was everything ready. On that day he took the oath of office on the balcony of Federal Hall in New York City. The building was long ago torn down, but, almost on the exact spot, on Wall Street today, you may see a bronze statue of the "Father of his Country," and in the City Hall is much of the furniture used by the first officers of our government. John Adams of Massachusetts became vice-president.

We are proud of the size, the wealth, and the population of our country today, but it was a very poor and weak nation then. The population was about four millions of people — no more than live now in the single city of New York. Not more than 100,000 lived west of the Alleghany Mountains, where great herds of buffalo roamed the plains and the Indians hid in the woods to attack the scattered pioneers. Most of the people got their living by farming or fishing, though cotton manufacturing was just beginning, and a few iron foundries existed. Molasses brought from the West Indies was made into rum, and on every farm was a spinning wheel and a loom. Small ships were built in New England from which to fish, or with which to trade with the West Indies. For the most part the young nation depended upon Europe for its manufactures.

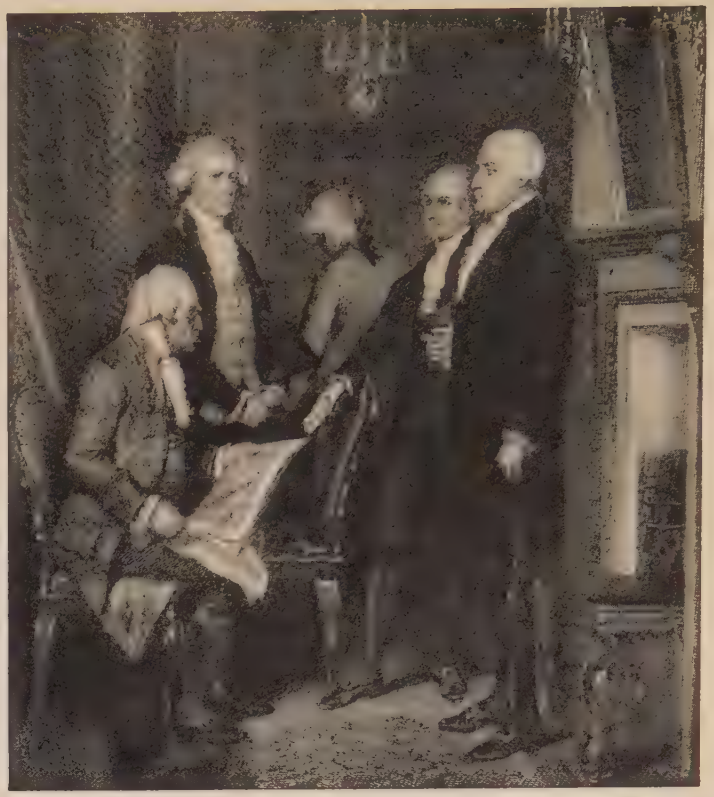
THE UNITED STATES IN WASHINGTON'S TIME

Railroads, telegraphs, telephones, gas, electric lights, and matches were unknown. People travelled from place to place on horseback, in carriages, by boat or by stages. These last named took a week to go from Boston to New York, if they did not stick in the mud. We can now travel the distance in five hours, and can go from New York to Berlin more quickly than Washington could go from Mt. Vernon to New York. Candles were generally used for lighting at this time and even much later. Fire was usually made by striking a flint stone with a piece of steel. Coal was hardly used at all.

Only four or five towns deserved the name of city at all. Boston and New York were unpaved, unlighted towns in the streets of which the cattle and pigs moved at will. Philadelphia was the largest town, and was noted for its paved sidewalks and its fine houses. Charleston was an important port and ships from England came for the rice and indigo bringing with them manufactured goods of every kind. Baltimore was smaller, but was prosperous, and had one fine street.

The life of the farmer and of the farmer's wife was hard. There was

THE BEGINNING OF THE GOVERNMENT OF THE NEW NATION



On April 30th, 1789, George Washington was inaugurated President of the United States at Federal Hall, on Wall Street, New York City. The Sub-Treasury, with its fine statue of the first president, now occupies the spot. The second picture shows his first advisers. Henry Knox, Secretary of War, is seated; next stands Thomas Jefferson, Secretary of State, and to Washington's right is Alexander Hamilton, Secretary of the Treasury. These were the only cabinet officers at first.

no machinery to save labour, such as we now see on almost every farm. Everything was done by hand. The farmer's wife took care of the house, spun yarn, wove cloth, and made the clothes for the family, knit stockings, made soap and candles, looked after the milk and butter, cured the meat, made sausages, and did hundreds of other things, helped by her daughters. The sons helped the father on the farm. Often the father tanned the hides of the cattle and made the family shoes from the leather. He was often forced to be a carpenter and a blacksmith as well as a farmer.

There were few newspapers and we should think them very poor. They were small, badly printed, and had few readers. Books were scarce and high in price. Even lawyers and doctors had very few. Mails were slow and seldom arrived in time. Often a letter took weeks to make a trip now made in hours. The people in one state knew little of those in another, and sometimes people in different parts of the same state were entire strangers. We know now more about what happens in Japan or India than the Georgian knew about what happened in Connecticut.

SOME FINE HOUSES IN THE COUNTRY

Very little attention was given to music, literature, art or architecture, though there were some fine private houses filled with furniture, silver and china brought from Europe. The houses were heated by great fireplaces and had none of our modern conveniences such as running water, bath-tubs or cooking stoves.

Many of our common vegetables such as the tomato, the cauliflower and the egg plant were unknown. Apples and pears were small and not very good, while the only strawberries or raspberries were those which grew wild. Ice was kept only by the wealthy, who built private ice-houses. Our modern way of preserving the flavour of fruits and vegetables by putting them into tin or glass was not used then, but they were dried in the sun.

Such was the country over which Washington was chosen president. His work was not easy. The Congress had borrowed much money which it could not pay, and no one would trust the new government. Money had to be found to pay these debts and to pay the officers of the government. The people did not believe in keeping an army in time of peace but all knew that we must have a small force to keep the Indians in order. A navy was also necessary, but armies and navies cannot be kept up without money.

HOW MONEY WAS FOUND TO RUN THE GOVERNMENT

Washington chose as Secretary of the Treasury—as the officer in charge of the money affairs of our government is called — the young Alexander Hamilton about whom you have read. This young man knew his business and got Congress to lay a small tax on goods from abroad. The colonists had opposed such taxes when laid by Great Britain but now they made no objection and soon the treasury had money enough.

Such a tax is called a tariff or an import duty. It is called an indirect tax because people pay it without knowing it. The merchant who brought in the foreign goods paid the tax first. Then he added the tax and his profit to the price of the goods. The people who bought the goods could not know how much of the price they paid was the cost of the manufacture, how much was cost of bringing from abroad, how much was tax, and how much was profit, and so they did not object.

If Hamilton had persuaded Congress to tax every house, every farm, and all other property, that would have been a direct tax because it was collected directly from the owner of the property. Some of the states might have forbidden their citizens to pay such a tax, and the Union might have been broken up. He did cause a small direct tax to be placed on whiskey, and some people in

Here is the interior of one of the homes of which we speak in the text. There were many houses in Virginia equal in every respect to this. Notice the solidly built furniture and the general air of comfort. Towns were few and company was so much valued that a servant was often sent to the taverns to request strangers to come to spend the night.

This picture of Sunday at Old Bruton Church at Williamsburg, Virginia, shows the dress and manners of the times of which our article treats. Notice the powdered hair, the cocked hats and ceremonious manners of the gentlemen. Williamsburg was once the capital of Virginia, and George Washington, Thomas Jefferson, Patrick Henry, Richard Henry Lee, and many other famous men attended service here.

Photograph, by Underwood & Underwood, New York.

Pennsylvania refused to pay it. But Washington called out troops and the people gave in and agreed to pay the tax.

WE HAVE TROUBLE WITH ENGLAND AND FRANCE

In another part of our book, you may read of the French Revolution which began in 1789. Many of our citizens sympathised with France. They said that the French had helped us in the Revolution, that they had established a republic like ours, and because of this fact they were at war with England. England was our enemy too, for she still kept soldiers in some forts on American soil, and her warships stopped American vessels to look for English sailors. For these reasons they said that we ought to help France even if it brought another war with England.

Washington knew that we were not yet strong enough to fight England again, and besides he felt that in France the Revolution was going too far. So he declared, in 1793, that the United States would remain neutral, which meant that we would take neither side. We made no friends by this plan, for both France and England captured our ships if they were sailing to the other country. England captured more of them because she had more warships, and it took all of Washington's strength to keep Congress from declaring war against that country, but he succeeded. He knew that we were growing stronger every year, but that if we fought with England again we could get no help from Europe, and we would be almost sure to lose our independence.

POLITICAL PARTIES BEGIN IN THE UNITED STATES

During Washington's first term there had been no political parties in the country, but during his second, which began in 1793, the people began to divide. One party, led by Hamilton and John Adams, wished a very strong central government. They did not believe in the rule of the people but thought that only the wealthy and the well-educated should have a voice. Thomas Jefferson said that the best government was that which governed least, and that all the people were more likely to be right than a few, no matter how rich and well-educated they were. The followers of Hamilton were called Federalists and those of Jefferson were first called Republicans, but later were called Democrats.

Washington tried hard to keep the peace between these parties but found it hard work. When his second term was almost over he declared that he would not serve a third term though a great majority of the people wished him to continue in office. At the election the vote between Adams and Jefferson was very close, but Adams was chosen.

"MILLIONS FOR DEFENCE BUT NOT ONE CENT FOR TRIBUTE"

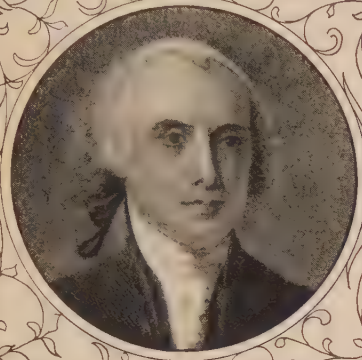
Adams was not popular in France and that country did not like his election. Then too the French were angry because we had made a treaty with England instead of fighting. So they began to capture our ships, and when we objected, our representatives in France were told privately that if we would bribe some French ministers, our vessels would not be captured. When this base offer became known in this country it was reported that Charles C. Pinckney, one of our representatives, had said, "Millions for defence, but not one cent for tribute." The people were much excited, an army was raised, Washington was made commander and some warships were built which captured some French vessels. When France found that the United States would fight, she became quite willing to make peace.

The remainder of Adams's administration was full of trouble. Some foolish laws were made. One gave the president power to send any foreigner out of the country without a trial, or else to put him in prison. Another punished anyone who opposed the government or who published anything which was thought to make people think less of the officers. These laws, called

SOME BUILDERS OF THE NEW NATION

HAMILTON

JEFFERSON



MADISON

ADAMS

PINCKNEY

CLINTON

The chief builder of the nation was, of course, Washington, of whom we have shown many pictures. These are not all who had a share, but they were all important. The firmness of John Adams gained a favourable treaty of peace from England, while Hamilton's skill in money affairs put the nation on its feet. We have said much about Jefferson. Charles Cotesworth Pinckney was prominent in his day. Madison was our fourth president. DeWitt Clinton built the Erie Canal, of which we shall hear more.

the Alien and Sedition Laws, were so unpopular that Adams was not given a second term, but Jefferson was elected in his stead.

THE PURCHASE OF LOUISIANA DOUBLES THE SIZE OF OUR COUNTRY

The most important event during the eight years Jefferson was president was the purchase of Louisiana. You were told on page 886 how France gave to Spain in 1763 all the territory she claimed west of the Mississippi River. In 1801 Spain gave it back to France as Napoleon had a dream of founding a new French nation in the New World. He soon saw that the English fleet could destroy any colony he might plant, and besides he needed the money for his wars. So he sold the whole territory, which was greater in size than the United States at that time, for $15,000,000. From it thirteen states, or parts of states, have been made. Some of them, as Iowa and Missouri, are now among the richest and most prosperous states of the Union.

There were only about 40,000 people in this great territory, and many prominent men thought that it would be hundreds of years before it would have many settlers. Some men advised the New England states to secede, that is, to leave the Union, if the territory was taken by the United States. Only nine years later (1812) a small part of the territory was admitted to the Union as the state of Louisiana, and in 1821, another part became the state of Missouri. A hundred years after the purchase, the population of the whole territory was more than 15,000,000, and the value of the crops raised and the goods manufactured every year was more than two hundred times as much as the whole price paid.

WE GAIN A CLAIM TO LAND ON THE PACIFIC COAST

Little was then known of the Pacific coast. In 1792 Captain Robert Gray had sailed into a great river, which he called Columbia after his ship, and the country around was generally called Oregon, but very little was known about it. Jefferson determined to send William Clark and Meriwether Lewis to explore. Before they started Louisiana was bought. The expedition left St. Louis in 1804, went 1600 miles up the Missouri River before winter set in, and the next spring went on until the river grew so small that a man could step across it. They then crossed the Rocky Mountains and found another river which they followed to its mouth where Captain Gray had entered. No white men had ever made this trip before them, and their exploration helped the United States to claim Oregon when the dispute arose with Great Britain many years afterward.

FRANCE AND ENGLAND BOTH PREY UPON US

During the years of Jefferson's administration, England was trying to crush Napoleon, who had conquered most of Europe. England declared all seaports in Napoleon's power to be blockaded, that is, closed against vessels from any other nation, and Napoleon answered by declaring all British ports blockaded. The United States had many merchant ships which traded with Europe, and both France and England began to capture them if they were sailing toward the ports of the other nation, just as they had done during Adams's administration. In 1807, one hundred and ninety-four of our vessels were captured by England, and many by the French. Besides, England stopped our ships to look for sailors who had deserted, and sometimes took men born in the United States.

Jefferson tried hard to avoid war, for he felt that we were not yet strong enough to fight, and tried to punish both countries by getting Congress to pass laws forbidding our ships to trade with either country. While these laws hurt France and England, they hurt our own country more, and caused Jefferson to lose some of his popularity, but a majority of the people wanted him to serve a third term. He followed Washington's ex-

A FRENCH FLEET SEARCHES IN VAIN FOR LOUISIANA

After La Salle had floated down the Mississippi River in 1682, and called the country Louisiana, he went to France to get men and supplies to found a colony. On his return he could not find the mouth of the river. Here we see his ships in the Gulf of Mexico, seeking to find again the land which was to be taken away from France, regained, and finally to be sold and become a part of the United States.

ample and refused, and it has grown to be the custom to elect no president to serve more than two terms of four years each.

A FORMER VICE-PRESIDENT IS THROWN INTO PRISON

During Jefferson's administration the country increased rapidly in population and wealth. In 1807, Robert Fulton, of whom you may read in another place, ran his steamboat, the Clermont, on the Hudson River, and soon such boats were on all our rivers. A sad event was the death of Alexander Hamilton, who was killed in a duel in 1804, by Aaron Burr, then the vice-president. Later Burr had a plan to set up a monarchy in the West, but the plan failed, and the man who had been the second highest officer in our government was thrown into the common jail in Richmond while awaiting trial.

WHY VIRGINIA IS CALLED THE "MOTHER OF PRESIDENTS"

Our next president was James Madison, also a Virginian. In fact, during the first thirty-six years of our government, Virginia furnished the presidents for thirty-two, and so came to be called the "Mother of the Presidents." Madison was one of the ablest and one of the best men who have ever been president, but he came into office at a hard time. Both England and France were capturing our ships, and the Indians west of the Alleghanies were murdering the settlers, who were moving westward in large numbers.

Though Madison loved peace as much as Washington or Jefferson, the idea of war with England had become popular. The western people hoped to capture Canada and add it to the Union. They could not see the difficulties in the way, and, in 1812, war was declared. In the Constitution we declared that a foreigner could become an American citizen after a term of years. England said, "Once an Englishman, always an Englishman." She claimed, therefore, that a man born in England was a British subject, though he might have lived in the United States twenty years and be a citizen, or even an office-holder.

Four reasons for declaring war were given. (1) England had stirred up the Indians in the West. (2) She had captured 900 of our merchant ships in ten years. (3) She had blockaded our coasts. (4) She stopped our ships and impressed, that is, took off by force, our seamen, pretending that they were British deserters.

We then had about eight million people; England had twenty million. We had twelve ships with 4,000 sailors and 1,500 marines; England had 830 ships and 150,000 sailors. Two hundred and thirty of her ships were larger than any of ours. Our army was small, while England had many thousand trained soldiers. Most of them, however, were occupied against Napoleon at this time. Worse than all our other weaknesses was the fact that New England did not want to fight. The profits of shipbuilding and trading were so great that New Englanders felt that they could better afford to have some ships captured than to go into a war and have their trade cut off.

THE AMERICAN SHIPS AND SAILORS ASTONISH THE BRITISH

Two attempts to invade Canada failed, and the British captured Detroit, because the American officers were cowardly or were poor commanders. But on the sea the result was different. The American frigate, Essex, captured the Alert. Another American frigate, the Constitution, began, a few days later, her wonderful career by making a wreck of the British Guerrière in half an hour. The Guerrière was not quite so large a ship as the Constitution but the fire of the latter was the most accurate that had ever been seen. A few months later the Wasp took the Frolic, and the frigate United States took the Macedonian. This British ship lost a hundred and six men and the Americans lost twelve. Two months later the Constitution took the Java, and early in 1813, the Hornet took the Peacock.

England was stunned. During

almost continual war with France for twenty years she lost only five vessels, and had taken hundreds. Here in six months she had lost six and had taken none. Was it possible that she was no longer "Mistress of the seas?"

THE TIDE TURNS. "DON'T GIVE UP THE SHIP"

But during 1813, the tide turned. The British frigate Shannon, under Captain Broke, offered battle to the American frigate, Chesapeake. Though the Chesapeake had a new and untrained crew, Captain Lawrence had come to despise British skill, and sailed out to meet the Shannon, which had a good crew. In a few moments the Chesapeake was disabled and her commander was wounded, but as he was carried below he cried, "Don't give up the ship." Some of the sailors refused to fight and the ship was given up, though Captain Broke, of the Shannon, was killed.

"WE HAVE MET THE ENEMY AND THEY ARE OURS"

On land things went against us at first this year, and it began to seem as if we were to lose territory instead of capturing Canada, but in May, York (now called Toronto) was captured and the government building was burned. Then this same year a wonderful victory occurred. Lieutenant Oliver H. Perry built a small fleet on Lake Erie in a few weeks, and, on September 10, 1813, met a British fleet. The fighting was fierce, and on Perry's own little ship all the crew except eight were killed or disabled. They made their way in an open boat to another of his ships carrying their flag with them, and continued to fight. In a little while he was able to send the report, "We have met the enemy and they are ours." This victory enabled General William Henry Harrison to defeat the British and Indians and recapture Detroit.

The next year another attempt was made to invade Canada under Generals Jacob Brown and Winfield Scott. We shall hear much more of the second name in the next story of our land. Two very bloody battles were fought at Chippewa and at Lundy's Lane within sound of Niagara Falls, but though the Americans were successful, they were forced to retreat. The British tried to send a fleet and army by way of Lake Champlain by much the same road which Burgoyne, of whom you read on page 988, had taken, but at Plattsburg both fleet and army were driven back.

Another man who afterward won great fame now comes into notice. The Creek Indians in Alabama, who had risen against the Americans, were crushed, March 27, 1814, by a force under Andrew Jackson, about whom you may read on page 792 and in the next volume but one, and never made much trouble afterward.

WASHINGTON CAPTURED AND BURNED BY THE BRITISH

Just about this time Napoleon was defeated and driven from France, and England sent more soldiers to the United States. One force under General Ross found that Washington was not well defended, marched on the city and captured it without trouble. In return for the burning of Toronto, the Capitol and the White House were burned as you may read on page 390. Next they attempted to capture Baltimore, but were driven back. While a British fleet was bombarding the fort in the harbour Francis Scott Key wrote our national song, "The Star Spangled Banner."

All this time the Americans were successful on the sea. Most of the warships were blockaded in the harbours, but many privateers roamed the seas destroying British commerce. A privateer was a ship owned by a private individual, which was given permission to capture merchant vessels of the nation with which the country of the privateer was at war. Many of our ship owners put a few small cannon on board and instead of carrying goods sailed about looking for the enemy's trading vessels. An English paper said, "If they fight they are sure to conquer, if they fly they are sure to escape."

WHY THE NEW ENGLAND STATES OPPOSED THE WAR

The New England States continued to oppose the war, because it interfered with their profits. They would not allow their soldiers to fight outside their own state, and hindered the government in every way. In December, 1814, a number of their leaders met in Hartford, and advocated dissolving the Union. You will notice that during the first twenty-five years of our government, New England was threatening to leave the Union, a great deal of the time.

Next the British on January 8th, 1815, made an attack on New Orleans. Andrew Jackson, who defended the city, had thrown up breastworks made partly of cotton bales. Many of his men were Tennessee and Kentucky backwoodsmen, who could hit a squirrel in the top of the highest tree. The British commander, Sir Edward Pakenham, was a brother-in-law of the Duke of Wellington and his force was made up of veteran soldiers. He was like Braddock in looking down on the American troops, and instead of marching around them, determined to capture the breastworks. The British fought bravely but the wonderful marksmanship of the Americans was too much for them, and within less than half an hour, the British retreated, leaving 2,600 dead or wounded before the rude defences. Among the killed was their commander, but the American loss was only eight killed, and thirteen wounded. This was the most brilliant land victory of the war.

It is sad to think that this terrible sacrifice of life was unnecessary. On Christmas eve, two weeks before, a treaty of peace had been signed. But there was then no ocean telegraph, and no steamship had as yet crossed the ocean. Not until many days after the battle was the news received in this country.

THE TREATY OF PEACE SIGNED AT GHENT

The treaty of peace was a very strange paper. The chief reason we had gone to war was because England had stopped our vessels to search for forbidden goods, and had taken off sailors claiming them to be British subjects. Not a word was said about these matters in the treaty, but England did not stop any more of our ships. The truth is that both sides were anxious for peace. England wished it because the entire map of Europe had to be made over on account of the fall of Napoleon, and we wished it because our government seemed about to break down.

The war had been a great strain on the government, and except for what our navy did, we cannot be very proud of it. Congress was afraid to levy taxes high enough to get enough money, and many of our generals proved themselves poor leaders. The sections were so jealous of one another and of the Union that we did not do our best. But there was a bright side.

WHAT THE WAR DID FOR THE NATION

This war marks the end of the time of weakness for the new nation. It was again proved that, if the American was properly trained and properly led, he was at least a match for the best soldiers of Europe. On the sea American ships and sailors acknowledged no equals. In thirteen naval battles we were successful in eleven. We had beat England on the sea and no other nation had done this.

Then too, a feeling of pride in the United States had been brought out. In the beginning of the nation men were proud of their states and jealous of the nation. As new states were made the people felt that the Union was more important, for the Union had made the state. At the end of the war there were eighteen states, and six more were admitted in less than ten years.

Though the westward movement of the people had been great before the war, it was many times greater afterward. Thousands left the eastern states every year to make new homes in the wilderness. Forests were cleared, farms were planted, and towns sprang up almost like magic. In our eighth volume we shall tell you more of this great movement.

Continued on page 1593

A BATTLE FOUGHT AFTER PEACE WAS MADE

The battle of New Orleans, January 8th, 1815, is one of the most astonishing in the history of war. Here Wellington's veterans, supposed to be the best soldiers of Europe, were put to rout by a crowd of untrained backwoodsmen under a leader who had had no regular military training. Here we see General Jackson behind his breastworks, which had been hastily thrown up, but which proved themselves sufficient.

War is a terrible thing, even if it seems sometimes necessary. Sir Edward Pakenham came of a noble family, had won great reputation as a soldier in the wars with Napoleon, and came to America expecting to increase that reputation. He undervalued the American forces at New Orleans,—rashly attempted to storm the breastworks, and fell himself.

THE BRIDGE THAT LED TO ROME

And Fathers mixed with Commons,
Seized hatchet, bar, and crow,
And smote upon the planks above,
And loosed the props below.

But friends and foes in dumb surprise,
With parted lips and straining eyes,
Stood gazing where he sank;
And when above the surges
They saw his crest appear,
All Rome sent forth a rapturous cry,
And even the ranks of Tuscany
Could scarce forbear to cheer.

MACAULAY'S "LAYS OF ANCIENT ROME"

LORD MACAULAY was a great historian and a famous poet. His "Lays of Ancient Rome," published in 1842, are the most celebrated of his poetical writings. They tell us stirring stories of the early days of Rome as they might have been told by a poet living between three and four hundred years before Christ. These stories are not entirely true; they are partly true, however, and we call them legends. There was a real Horatius, whose second name was Cocles, which meant that he had only one eye; but no doubt his power is exaggerated in the legend here told. Etruria was an ancient kingdom in Italy, north of Rome; Lars Porsena, King of Etruria, declared war against Rome because that city had expelled its king, whose family came from Etruria; and Sextus, who accompanied Porsena, was the eldest son of the expelled King Tarquin. Rome was now a republic.

HOW HORATIUS KEPT THE BRIDGE

CONTINUED FROM 1278

LARS PORSENA of Clusium
By the Nine Gods he swore
That the great house of Tarquin
Should suffer wrong no more.
By the Nine Gods he swore it,
And named a trysting day,
And bade his messengers ride forth
East and west and south and north,
To summon his array.

. . . . . .

And now hath every city
Sent up her tale of men;
The foot are fourscore thousand,
The horse are thousands ten:
Before the gates of Sutrium
Is met the great array.
A proud man was Lars Porsena
Upon the trysting day.

. . . . . .

But by the yellow Tiber
Was tumult and affright:
From all the spacious champaign
To Rome men took their flight.
A mile around the city,
The throng stopped up the ways;
A fearful sight it was to see
Through two long nights and days.

. . . . . .

To eastward and to westward
Have spread the Tuscan bands;
Nor house, nor fence, nor dovecote
In Crustumerium stands.
Verbenna down to Ostia
Hath wasted all the plain;
Astur hath stormed Janiculum,
And the stout guards are slain.

I wis (think), in all the Senate,
There was no heart so bold,
But sore it ached and fast it beat,
When that ill news was told.
Forthwith up rose the Consul,
Up rose the Fathers all;
In haste they girded up their gowns,
And hied them to the wall.

They held a council standing
Before the River Gate;
Short time was there, ye well may guess,
For musing or debate.
Out spake the Consul roundly:
"The bridge must straight go down;
For, since Janiculum is lost,
Nought else can save the town."

Just then a scout came flying,
All wild with haste and fear;
"To arms! to arms! Sir Consul:
Lars Porsena is here."
On the low hills to westward
The Consul fixed his eye,
And saw the swarthy storm of dust
Rise fast along the sky.

And nearer fast and nearer
Doth the red whirlwind come;
And louder still and still more loud,
From underneath that rolling cloud
Is heard the trumpet's war-note proud,
The trampling and the hum.
And plainly and more plainly
Now through the gloom appears,
Far to left and far to right,
In broken gleams of dark-blue light,
The long array of helmets bright,
The long array of spears.

And plainly and more plainly,
Above that glimmering line,
Now might ye see the banners
Of twelve fair cities shine;
But the banner of proud Clusium
Was highest of them all,
The terror of the Umbrian,
The terror of the Gaul.

And plainly and more plainly
Now might the burghers know,
By port and vest, by horse and crest,
Each warlike Lucumo.
There Cilnius of Arretium
On his fleet roan was seen;
And Astur of the fourfold shield,
Girt with the brand none else may wield,
Tolumnius with the belt of gold,
And dark Verbenna from the hold
By reedy Thrasymene.

Fast by the royal standard,
O'erlooking all the war,
Lars Porsena of Clusium
Sat in his ivory car.
By the right wheel rode Mamilius
Prince of the Latian name;
And by the left false Sextus,
That wrought the deed of shame.

But when the face of Sextus
Was seen among the foes,
A yell that rent the firmament
From all the town arose.
On the house-tops was no woman
But spat towards him and hissed,
No child but screamed out curses,
And shook his little fist.

But the Consul's brow was sad,
And the Consul's speech was low,
And darkly looked he at the wall,
And darkly at the foe.
"Their van will be upon us
Before the bridge goes down;
And if they once may win the bridge,
What hope to save the town?"

Then out spake brave Horatius,
The Captain of the Gate:
"To every man upon this earth
Death cometh soon or late.
And how can man die better
Than facing fearful odds,
For the ashes of his fathers,
And the temples of his Gods?

. . . . . .

"Hew down the bridge, Sir Consul,
With all the speed ye may;
I, with two more to help me,
Will hold the foe in play.
In yon straight path a thousand
May well be stopped by three.
Now who will stand on either hand,
And keep the bridge with me?"

Then out spake Spurius Lartius;
A Ramnian proud was he:
"Lo, I will stand at thy right hand,
And keep the bridge with thee."
And out spake strong Herminius;
Of Titian blood was he:
"I will abide on thy left side,
And keep the bridge with thee."

"Horatius," quoth the Consul,
"As thou sayest, so let it be."
And straight against that great array
Forth went the dauntless Three.
For Romans in Rome's quarrel
Spared neither land nor gold,
Nor son nor wife, nor limb nor life,
In the brave days of old.

Then none was for a party,
Then all were for the State;
Then the great man helped the poor,
And the poor man loved the great,
Then lands were fairly portioned,
Then spoils were fairly sold;
The Romans were like brothers
In the brave days of old.

Now Roman is to Roman
More hateful than a foe,
And the Tribunes beard the high,
And the Fathers grind the low.
As we wax hot in faction,
In battle we wax cold:
Wherefore men fight not as they fought
In the brave days of old

Now while the Three were tightening
Their harness on their backs,
The Consul was the foremost man
To take in hand an axe:
And Fathers mixed with Commons,
Seized hatchet, bar, and crow,
And smote upon the planks above,
And loosed the props below.

Meanwhile the Tuscan army,
Right glorious to behold,
Came flashing back the noonday light,
Rank behind rank, like surges bright
Of a broad sea of gold.
Four hundred trumpets sounded
A peal of warlike glee,
As that great host, with measured tread,
And spears advanced, and ensigns spread,
Rolled slowly towards the bridge's head,
Where stood the dauntless Three.

The Three stood calm and silent,
And looked upon the foes,
And a great shout of laughter
From all the vanguard rose:
And forth three chiefs came spurring
Before that deep array;
To earth they sprang, their swords they drew,
And lifted high their shields and flew
To win the narrow way;

Aunus from green Tifernum
Lord of the Hill of Vines;
And Seius, whose eight hundred slaves
Sicken in Ilva's mines;
And Picus, long to Clusium
Vassal in peace and war,
Who led to fight his Umbrian powers
From that grey crag where, girt with towers,
The fortress of Nequinum lowers
O'er the pale waves of Nar.

Stout Lartius hurled down Aunus
Into the stream beneath;
Herminius struck at Seius,
And clove him to the teeth;
At Picus brave Horatius
Darted one fiery thrust;
And the proud Umbrian's gilded arms
Clashed in the bloody dust.

Then Ocnus of Falerii
Rushed on the Roman Three;
And Lausulus of Urgo
The rover of the sea;
And Aruns of Volsinium,
Who slew the great wild boar,
The great wild boar that had his den
Amidst the reeds of Cosa's fen,
And wasted fields and slaughtered men,
Along Albinia's shore.

Herminius smote down Aruns;
Lartius laid Ocnus low;
Right to the heart of Lausulus
Horatius sent a blow.
"Lie there," he cried, "fell pirate!
No more, aghast and pale,
From Ostia's walls the crowd shall mark
The track of thy destroying bark.
No more Campania's hinds shall fly
To woods and caverns when they spy
Thy thrice accursed sail."

And now no sound of laughter
Was heard among the foes.
A wild and wrathful clamour
From all the vanguard rose.
Six spears' lengths from the entrance
Halted that deep array,
And for the space no man came forth
To win the narrow way.

But hark! the cry is Astur:
And lo! the ranks divide;
And the great Lord of Luna
Comes with his stately stride.
Upon his ample shoulders
Clangs loud the fourfold shield,
And in his hand he shakes the brand
Which none but he can wield.

He smiled on those bold Romans
A smile serene and high;
He eyed the flinching Tuscans,
And scorn was in his eye.
Quoth he, "The she-wolf's litter
Stand savagely at bay;
But will ye dare to follow,
If Astur clears the way?"

Then, whirling up his broadsword
With both hands to the height,
He rushed against Horatius,
And smote with all his might.
With shield and blade Horatius
Right deftly turned the blow.
The blow, though turned, came yet too nigh;
It missed his helm, but gashed his thigh;
The Tuscans raised a joyful cry
To see the red blood flow.

He reeled, and on Herminius
He leaned one breathing-space;
Then, like a wild cat mad with wounds,
Sprang right at Astur's face;
Through teeth, and skull, and helmet
So fierce a thrust he sped,
The good sword stood a hand breadth out
Behind the Tuscan's head.

And the great Lord of Luna
Fell at that deadly stroke,
As falls on Mount Alvernus
A thunder-smitten oak.
Far o'er the crashing forest
The giant arms lie spread;
And the pale augurs, muttering low,
Gaze on the blasted head.

On Astur's throat Horatius
Right firmly pressed his heel,
And thrice and four times tugged amain,
Ere he wrenched out the steel.

"And see," he cried, "the welcome,
Fair guests, that waits you here!
What noble Lucumo comes next
To taste our Roman cheer?"

But at his haughty challenge
A sullen murmur ran,
Mingled of wrath, and shame, and dread,
Along that glittering van.
There lacked not men of prowess,
Nor men of lordly race;
For all Etruria's noblest
Were round the fatal place.

But all Etruria's noblest
Felt their hearts sink to see
On the earth the bloody corpses,
In the path the dauntless Three:
And, from the ghastly entrance
Where those bold Romans stood,
All shrank, like boys who unaware,
Ranging the woods to start a hare,
Come to the mouth of the dark lair
Where, growling low, a fierce old bear
Lies amidst bones and blood.

Was none who would be foremost
To lead such dire attack:
But those behind cried "Forward!"
And those before cried "Back!"
And backward now and forward
Wavers the deep array;
And on the tossing sea of steel,
To and fro the standards reel;
And the victorious trumpet-peal
Dies fitfully away.

Yet one man for one moment
Stood out before the crowd;
Well known was he to all the Three,
And they gave him greeting loud,
"Now welcome, welcome, Sextus!
Now welcome to thy home!
Why dost thou stay, and turn away?
Here lies the road to Rome."

Thrice looked he at the city,
Thrice looked he at the dead;
And thrice came on in fury,
And thrice turned back in dread:
And, white with fear and hatred,
Scowled at the narrow way,
Where, wallowing in the pool of blood,
The bravest Tuscans lay.

But meanwhile axe and lever
Have manfully been plied;
And now the bridge hangs tottering
Above the boiling tide.
"Come back, come back, Horatius!"
Loud cried the Fathers all.
"Back, Lartius! back, Herminius!
Back, ere the ruin fall!"

Back darted Spurius Lartius;
Herminius darted back:
And, as they passed, beneath their feet,
They felt the timbers crack.
But when they turned their faces,
And on the farther shore
Saw brave Horatius stand alone,
They would have crossed once more.

But with a crash like thunder
Fell every loosened beam,
And, like a dam, the mighty wreck
Lay right athwart the stream.

And a long shout of triumph
Rose from the walls of Rome.
As to the highest turret-tops
Was splashed the yellow foam.

And, like a horse unbroken
When first he feels the rein,
The furious river struggled hard,
And tossed his tawny mane,
And burst the curb and bounded,
Rejoicing to be free,
And whirling down, in fierce career,
Battlement, and plank, and pier,
Rushed headlong to the sea.

Alone stood brave Horatius,
But constant still in mind;
Thrice thirty thousand foes before,
And the broad flood behind.
"Down with him!" cried false Sextus,
With a smile on his pale face.
"Now yield thee," cried Lars Porsena,
"Now yield thee to our grace."

Round turned he, as not deigning
Those craven ranks to see;
Nought spake he to Lars Porsena,
To Sextus nought spake he;
But he saw on Palatinus
The white porch of his home;
And he spake to the noble river
That rolls by the towers of Rome.

"Oh, Tiber! Father Tiber!
To whom the Romans pray,
A Roman's life, a Roman's arms,
Take thou in charge this day!"
So he spake, and speaking sheathed
The good sword by his side,
And with the harness on his back
Plunged headlong in the tide.

No sound of joy or sorrow
Was heard from either bank;
But friends and foes in dumb surprise,
With parted lips and straining eyes,
Stood gazing where he sank;
And when above the surges
They saw his crest appear,
All Rome sent forth a rapturous cry,
And even the ranks of Tuscany
Could scarce forbear to cheer.

But fiercely ran the current,
Swollen high by months of rain:
And fast his blood was flowing;
And he was sore in pain.
And heavy with his armour,
And spent with changing blows:
And oft they thought him sinking,
But still again he rose.

Never, I ween, did swimmer,
In such an evil case,
Struggle through such a raging flood
Safe to the landing-place;
But his limbs were borne up bravely
By the brave heart within,
And our good Father Tiber
Bore bravely up his chin.

"Curse on him!" quoth false Sextus;
"Will not the villain drown?
But for this stay, ere close of day
We should have sacked the town!"
"Heaven help him!" quoth Lars Porsena,
"And bring him safe to shore;
For such a gallant feat of arms
Was never seen before."

And now he feels the bottom,
Now on dry earth he stands;
Now round him throng the Fathers
To press his gory hands;
And now, with shouts and clapping,
And noise of weeping loud,
He enters through the River Gate,
Borne by the joyous crowd.

They gave him of the corn-land,
That was of public right,
As much as two strong oxen
Could plough from morn till night;
And they made a molten image,
And set it up on high,
And there it stands unto this day
To witness if I lie.

It stands in the Comitium,
Plain for all folk to see;
Horatius in his harness,
Halting upon one knee:
And underneath is written,
In letters all of gold,
How valiantly he kept the bridge
In the brave days of old.

. . . . . .

When the goodman mends his armour,
And trims his helmet's plume;
When the goodwife's shuttle merrily
Goes flashing through the loom;
With weeping and with laughter
Still is the story told,
How well Horatius kept the bridge
In the brave days of old.

JANUARY brings the snow,
Makes our feet and fingers glow.

FEBRUARY brings the rain,
Thaws the frozen lake again.

MARCH brings breezes loud and shrill,
Stirs the dancing daffodil.

APRIL brings the primrose sweet,
Scatters daisies at our feet.

MAY brings flocks of pretty lambs,
Skipping by their fleecy dams.

JUNE brings tulips, lilies, roses,
Fills the children's hands with posies.

HOT July brings cooling showers,
Apricots and gillyflowers.

AUGUST brings the sheaves of corn,
Then the harvest home is borne.

WARM September brings the fruit,
Sportsmen then begin to shoot.

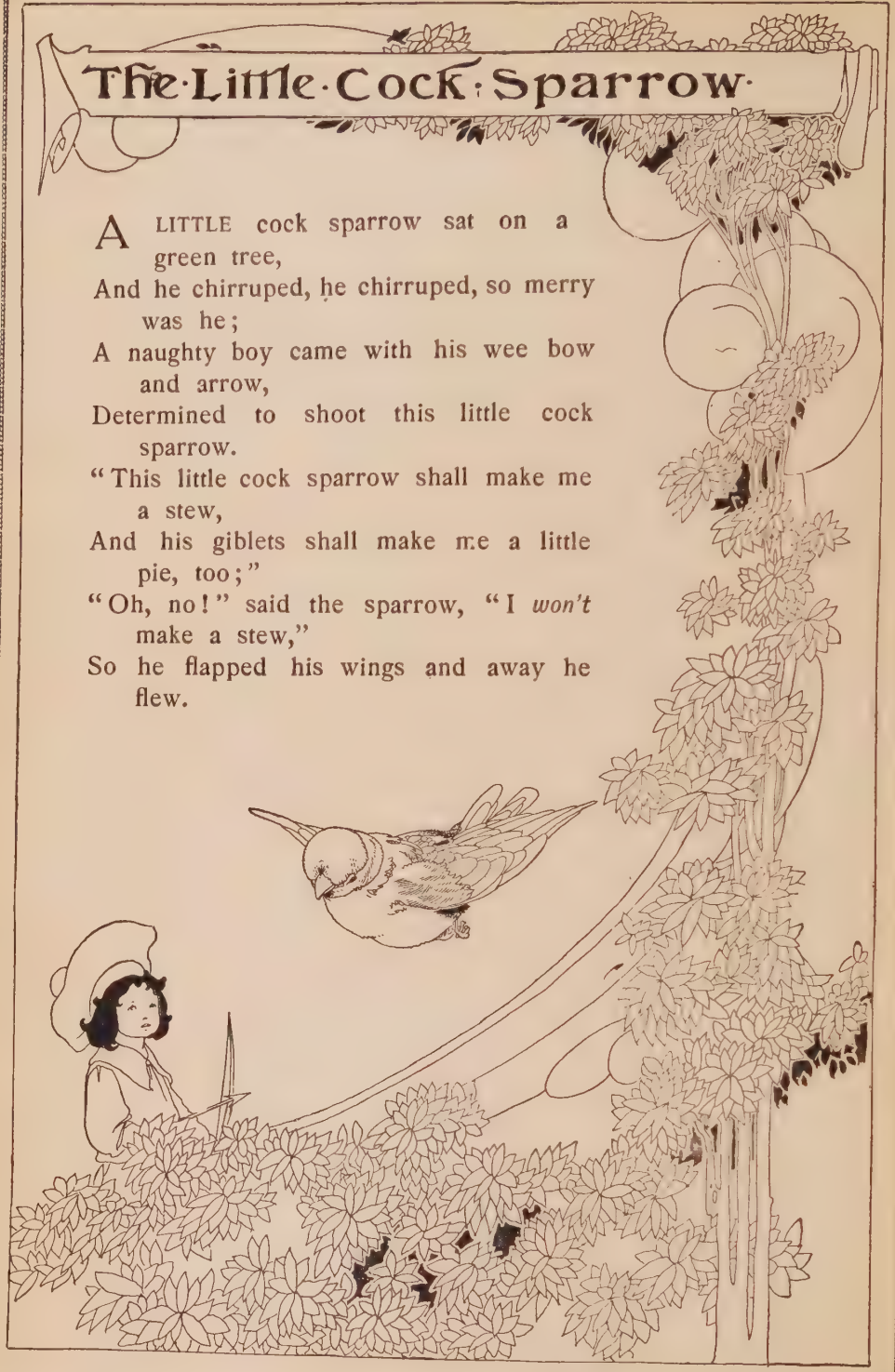
FRESH October brings the pheasant,
Then to gather nuts is pleasant.

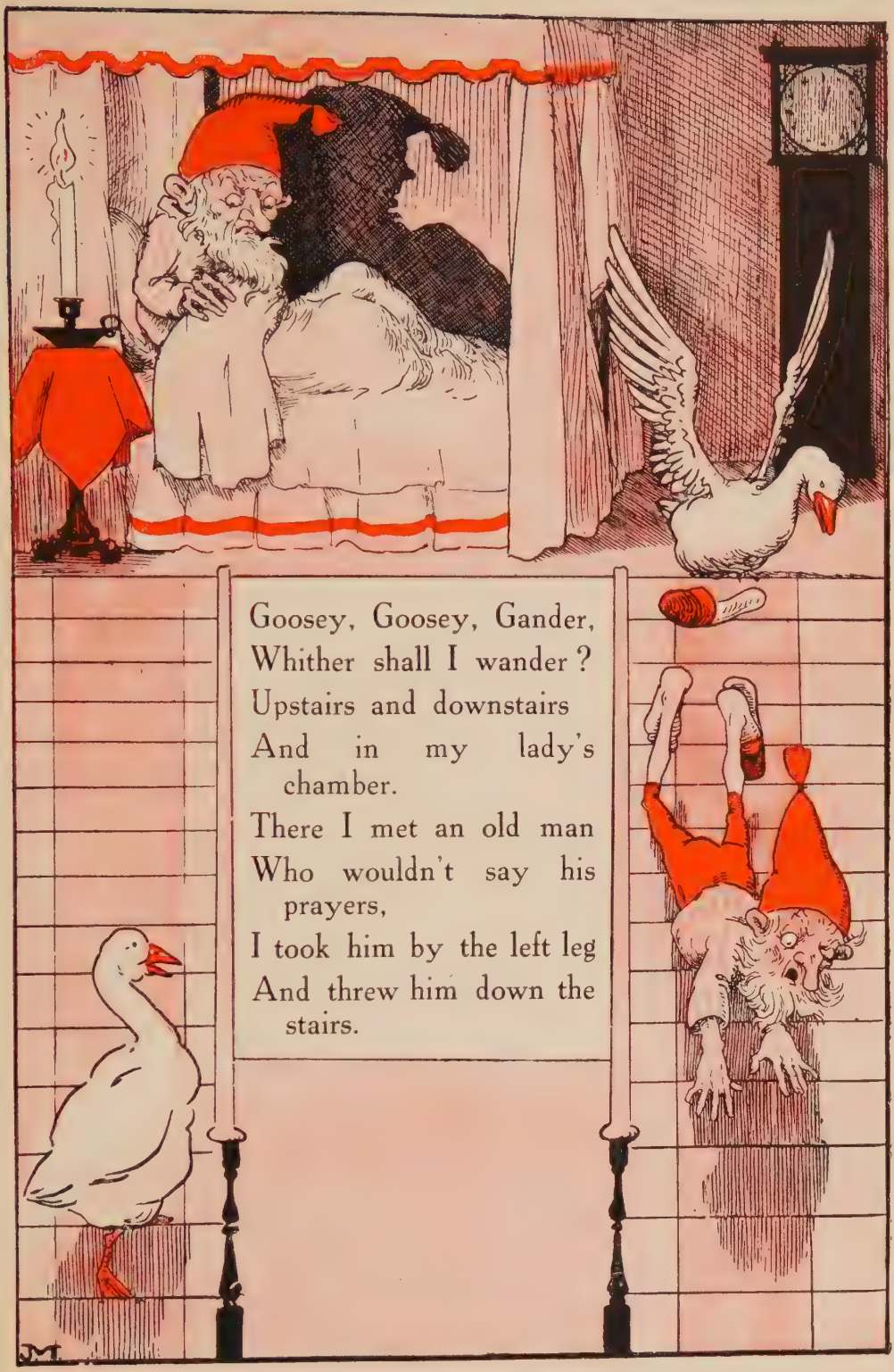
DULL November brings the blast,
Then the leaves are whirling fast.

CHILL December brings the sleet,
Blazing fire and Christmas treat.

The Little Cock Sparrow

A LITTLE cock sparrow sat on a green tree,
And he chirruped, he chirruped, so merry was he;
A naughty boy came with his wee bow and arrow,
Determined to shoot this little cock sparrow.
"This little cock sparrow shall make me a stew,
And his giblets shall make me a little pie, too;"
"Oh, no!" said the sparrow, "I *won't* make a stew,"
So he flapped his wings and away he flew.





Goosey, Goosey, Gander,
Whither shall I wander?
Upstairs and downstairs
And in my lady's chamber.
There I met an old man
Who wouldn't say his prayers,
I took him by the left leg
And threw him down the stairs.

The Knave of Hearts

1.

The Queen of Hearts
She made some tarts
All on a summer's day;

2.

The Knave of Hearts
He stole those tarts
And took them right
away.

3.

The King of Hearts
Called for those tarts
And beat the
Knave full sore;

4.

The Knave of Hearts
Gave back the tarts
And vowed he'd steal
no more.

A WALK BY THE SEASHORE

CONTINUED FROM 1343

ONE of the reasons for the existence of such things as railway lines, steam engines, express trains, guards, porters, and newsboys is the very simple but important fact that children who live in cities *must* be carried, with their buckets and spades, at least once a year to dig castles in the sands of the seashore. Thousands and thousands of dollars are spent in this manner. And if there were no buckets and spades, and no sand at the seaside, hundreds of guards and porters would be thrown out of work, and far fewer trains would go screeching and thundering across the green fields. So, you see, children are good for trade as well as good for nothing, as your nurse sometimes tells you.

But then there are other things to do at the seaside in addition to castle digging. Castle digging is, of course, the chief reason for the existence of the sand, and it *is* splendid—particularly when half a dozen diggers are at work, and the castle has terraces and turrets, with a deep moat running all round it and a bridge across it, and no end of sea-grass and tangled seaweed hanging over the parapets, like moss and lichen. But there are other things as well. There is paddling, for instance, a daring sport, something like fox-hunting, but one which the dear doctors say gives children so many illnesses. And there is also the joy of listening to organs, and going for rides on shaggy donkeys, whose saddles are worn into holes, showing the padding, and who smell like hot blankets and a bootmaker's apron. And there are cocoa-nut shies, and conjuring, and throwing stones at a tin bucket on papa's walking-stick, and tennis; and there is even kicking off our sand shoes and running barefoot races on the smooth-ribbed sand.

And there is—*going for a walk with our eyes open.*

Suppose you were taken one year not to Long Branch, or Portsmouth, or Nantucket, or Narragansett, or Coronada, or Norfolk, but to a little old rickety fishing village, with no esplanade, no pier, no band, no monkeys, no donkeys, *no nothing*—would it be very dull? Suppose, too, that instead of broad, smooth, yellow sands, the waves came breaking with a rattle and a roar on miles of shingle—miles and miles of stones!—would it be very dull? Well, it all depends on whether you keep your eyes open or shut, and whether you want to cram your brain with observation, or keep it only for the multiplication table and geography.

For a walk along the sands or along the shingle can be full of interest every yard of the way. To begin with, it is by the side of the sea that we can best feel the tremendous wonder of creation. The sea is older than anything else on the earth; it has always been there, and—just think of it—from the very beginning it has always been moving. Motion is a marvellous miracle. The motion of the sea, which you look at with your eyes, and the noise of it, which fills your ears, existed

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thousands and thousands of years before there was any animal walking about the earth, and wondering where in the name of fortune it came from. Stop and think about the deep boom of the ocean and the roar of the waves on shore and rock, going on for thousands of years before there was even a mouse or a grasshopper on the green earth. How grand, but how lonely it must have been!

Then think about the sands. Take up a handful near the cliffs, and it runs through your fingers like powder; go near to the waves, where it is wet, and you will see in it tiny grains of various colours. The sands have been smashed and powdered by the sea. Once they were shells and stones; the sea has ground them into dust. Every year the stones on a beach grow smaller and smaller. If you make a hole in the sand, and thrust your arm down as far as it will go, you will sometimes find rough sand.

Then, whether you walk on smooth yellow sand, or trudge heavily over pebbles, you will find no end of things which are most interesting to pick up and examine. There is the starfish, that little five-fingered, red-brown fellow, who lies dead or dying in hundreds all round the coast; turn him over on his back, and if he is alive you will find that he can turn himself over as cleverly as a gymnast, for he has any number of tentacles on his under-side, which he uses when he goes for a walk over the rocks in search of a seaside breakfast. He feeds, let me tell you, on dead fish, and things that no respectable live fish would look at for a moment, so he is useful to keep the sea clean.

Then there is the jellyfish, which floats in the waves and has to go wherever they choose to send him, for he has got no legs, no fins, no tentacles to speak of, and is really hardly a live thing at all. But it is just because he is such a helpless dead-alive old fellow that he is interesting. He reminds us of the very beginning of life. He is life at its lowest. He just goes about like a man in a dream, only bothering to keep all his pores open to drink water; and if you catch him, and lay him on the sands, the sun will soon drink him clean up, and leave nothing to tell he has ever been at all, except a streak of silvery-whitish slime. And yet he is ever so much more alive than the finest pair of patent-leather boots in a Chicago shop-window or the grandest statue in the Metropolitan Museum. He rides out a storm like a man-o'-war. It is only when we compare him with a milkman, or a boy spinning a peg-top and picking it up in his hand, that we see how very, very little alive he really is.

A very familiar thing found on the seashore is the egg-shell of a skate, looking like a tiny handbarrow. Generally the young skate is hatched before the shell is found.

Shells are wonderfully interesting things. Have you noticed that the shell of a whelk has its opening always on the right side? I know a man who is extremely happy because he once dug up in a crag-pit the shell of a whelk, much older than the human race, which has its opening on the left side. How did that happen? Or why should a shell almost always have its opening on the right side? Why is it? Have you ever thought about that? Nature is the most teasing riddle in the world, very hard to solve.

Sometimes you will find one of these whelk-shells inhabited by a funny little crab-like creature, who can be dragged out a great way, but will never leave go with his tail. He'll give you his head cheerfully, but never, never will he give up his tail to you or the Czar of Russia. He's most particular about his tail, and always leaves it behind him when he is pulled out of doors. This is the hermit crab, and he is the cuckoo of the seashore; for the lazy fellow never thinks of making his own shell; he says: "Why should I, when there are so many far better shells than ever I could make close at hand?" And he just pops into the cast-off

shell of some other creature, or even eats that creature out of house and home, and adds insult to injury by occupying the house and home himself after the dinner.

If I were to begin to tell you about crabs there would be no end to it; so I must only say, that if you want to make an alderman jealous, carry home two or three green crabs in a bucket of water, and then show the alderman how these brave fellows fight and tussle over every piece of meat you drop into the water. Crabs have magnificent appetites. Nothing, you see, can ever really be to them "a good blow out." I believe a crab would knock his own mother over, or dance on his baby sister, to get at a piece of lean beef or a slice of new spring lamb—and this, if you please, after he has just had a dinner big enough for a troop of horse. Crabs ought to be called sea-hogs.

The seaweed was perhaps the first thing that grew in the sea. This is the seaweed known as bladder-wrack, which floats ashore easily because the knobs we see on it are really little vessels of air.

The sea anemone is not so fierce-looking as the crab, but she—they are beautiful enough to be called shes—is hardly as nice in her behaviour as we could wish. Look at them in a rocky pool, lying so gracefully and innocently on the silver sand, with beautiful soft green sea-grass on each side of them. No wonder we call them anemones; they are the flowers of the sea. But look. A poor little baby shrimp—who has forgotten what his mother told him about keeping safe at home—darts out for a scamper across the pool. If we had very powerful eyes, we should probably see the anemone trembling all over with delight as jelly would on the dining-room table when someone kicks the leg. "Ha, ha!" says the innocent-looking anemone. "Fee-fi-fo-fum, I smell the blood of a shrimpyman!" and lo and behold, just as the baby shrimp darts across the top of the anemone, and touches the trembling tentacles, "*Snap!*" cries that deceitful creature, and holds the baby shrimp as tight as a nut in the crackers. It is all over with the shrimp. His mother will never see him again. He will never wag his tail and wink his eye at baby lobsters. He will never grow up to be caught by a respectable fisherman in a kind net, and eaten by a dear little boy with bread and butter and watercress at five o'clock tea. No; he has grown into one body with a beautiful and innocent-looking anemone.

There are hundreds of things to be looked at in pools. If you lie on the rocks, and keep quite still, looking down into the clear water, you will see many little fish, such as the blenny, and the fur-bearded rockling, and bright-coloured wrasses, besides no end of queer crabs, shrimps, and anemones. It is splendid work to observe all this mysterious life going on in one tiny pool, and to dream of what these creatures think, and to wonder what becomes of them—for they really are alive—when they die.

And it is also most interesting to make a collection of creatures and seaweed, and carry them home in a bucket or satchel, and examine them carefully under a big magnifying glass. You will be amazed to find how much extraordinary thought and power has gone to the creation of the very tiniest thing that you can find on the seashore.

WHAT ARE THE WILD WAVES SAYING?

The sea is always moving. It has never been still since the world was made, and it cannot be still so long as the earth keeps its place in the heavens. As we stand on the shore and watch the waves, we know that the sight which we see has been seen by men since they first came into the world. Old-time continents have vanished in the waves, and new continents have been built up on what was once the floor of the sea.

Time and tide wait for no man. When the tide comes in, we must leave the shore to the sea. When the tide goes out, we have the sands, newly washed and clean, to ourselves again. The sea, with the flow and ebb of its tide, washes the shores of the whole earth; and the air that comes in to us over its waves makes us strong and healthy. The sea is rough in these pictures, but underneath the waters are calm and still. The waves at sea do not "travel," but move only forward and back again, and they are only on the surface, not below.

WHAT THE TIDE LEAVES BEHIND

It is pleasant to sit down after a romp, and rest and think of the wonders of the pools and rocks, and to see such a vast stretch of seaweed as this gaining new life by coming into the sunshine for a few hours. Without the change from air to water and from water to air some of the seaweeds could not live. Some kinds live fifty fathoms deep.

We have all seen the long, thin ridges of sand on the beach, the marks made by the water. They are made by the movement of the waves, which are all controlled by Nature's laws. These ripples of sand are very interesting to look at and scientists who have studied them have come to believe that, perhaps, the Goodwin Sands, on which so many ships have been wrecked, are only huge "ripples," which may, perhaps, be removed by the skill of engineers.

LIVING THINGS CAST UP BY THE SEA

Such creatures as these are cast up every day by the sea, and we do not think, perhaps, as we look at them, that these little things have life. Of course they have. The starfishes left by the tide will be all right when the next tide comes in. The little bundles on the right are eggs, which will soon turn into numerous young whelks.

This poor jellyfish ought to have said good-bye to the sea before being cast up by the tide. Unless it can be continually taking in sea-water, the jellyfish must die. Exposed to the air, the water that it contains dries up, and the whole jellyfish disappears, leaving only a silvery mark on the ground where it was stranded.

THE SAND BUILDERS OF THE BEACH

Can this be a strong castle which a scowling baron has built to keep children from the shore? No; it is a beautiful work made of sand, over which the smallest child could hop, and will soon be washed away.

Bold barons may build castles; but so, at the seaside, may little maids. Here are plenty of them all together, each one full of fairies and mermaids and the other wonderful creatures which live in a little girl's fancy.

Here we have what looks like a fine strong bridge, with buttresses and parapets, built to carry trains across a river. But, if we look at the spade behind, we see that the bridge is of sand, and quite a tiny structure.

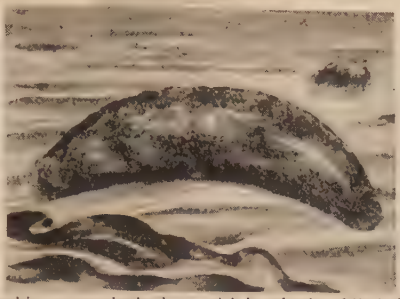
THE HERMIT CRAB IN HIS SHELL

The whelk is one of the terrors of the smaller shellfish, upon which he lives. He has 300 teeth, as sharp and hard as files. With these he cuts through the shell and eats the fish inside. But the whelk has a master in the hermit crab, which steals his home and lives in it. In this picture we see together a whelk and a crab.

The hermit crab has his claws in shells, but he has only a soft skin covering for his tail, which any lobster or big crab would bite off. So he creeps into the shell of the whelk, and wherever he goes he drags the shell about with him. He is a fierce little crab, and fights in safety while his tail is protected by the shell of the whelk.

The crab and the sea-urchin are two of the wonders of sea life. The crab sheds his shell every year. It manages, in a marvellous manner, to withdraw its great claws through the tiny holes of its shell. The sea-urchin is a wonder of a different sort. As its egg-like body grows, so its hard, prickly shell grows too, just as if it were a soft plant. It is called a sea-urchin because it is like a hedgehog, by some country folk called an "urchin."

COMMON OBJECTS OF THE SEASHORE



The first picture shows a sea-urchin, or sea-hedgehog, with hundreds of little jointed spines for legs. When it dies they get broken off, and you see the plates of the shell armour beneath. The third picture shows the little spots where the spines joined on. Hold the shell towards the light and you will see tiny holes, a big mouth, and what strong jawbones! The sea-cucumber, unlike the sea-urchin, is soft. It tries to make a shell under its coat.

The large snail-like shells are whelks', and the shellfish that live in them are good to eat. The shells like Chinese hats, which little girls use for dolls' hats, are limpet-shells. A limpet can only defend itself by sticking so fast to a rock that you cannot tug it off. Just try; the harder you pull, the faster it will stick to the rock. The wee fluted shells are cowries, which some native races in West Africa and South Asia use for money.

The first picture shows a jellyfish, with its arms and stings out, floating lazily along in the water. It wraps them round its food, and pushes it into its mouth underneath. The middle picture shows the tube-worms, which make tubes of shell or sand to live in on the big shells or rocks. They breathe through the tufts. The last picture is a sea-anemone which chose to live on a whelk-shell, and is ready for the next shrimp.

The photographs on these pages are by Prof. B. H. Bentley, Messrs. Valentine, and others.

CHILDHOOD'S ANCIENT FIELD OF PLAY

Nowhere else can young people have such fun as at the seaside, with sand, and water, and seaweed, spades and pails, and treasures all their own. Still we are able to say of the little child, as a poet said long ago:

Shoreward she hies, her wooden spade in hand,
Straight down to childhood's ancient field of play,
To claim her right of common in the land
Where little edgeless tools make easy way—
A right no cruel Act shall e'er gainsay,
No greed dispute the freedom of the sand.

THE NEXT PICTURES OF FAMILIAR THINGS BEGIN ON PAGE 1535

WHAT THIS STORY TELLS US

WE know something about the elements and the atoms of which they are made; and we have guessed that atoms are not really "uncutable," as the word says, but must be made of something simpler still. In these pages we learn that atoms were not made out of nothing once for all, but are changing from age to age, some slowly and others quite quickly. We can see big atoms breaking up into smaller ones, and into tiny particles which are really electric, and are called electrons. These electrons are so small that there are great numbers in a single atom. They are the real units out of which atoms are made, and the discovery of them, within the last twelve years, is one of the greatest in the whole history of science. They are a new kind of atoms, atoms of electricity, and though we call them electrons, they are really entitled to be called atoms, for they cannot be divided or cut, whereas men have just discovered that the things we do call atoms can be cut and divided.

THE MAKING OF THE ELEMENTS

CONTINUED FROM 1295

WE have seen that several, at least, of the elements have a history which we can trace. We can actually watch some of them being made before our eyes—elements with small atoms, made by the breaking up of the large atoms of other elements. We are quite certain that, of the elements we know, helium, argon, neon, and radium are now being made in the earth from other elements—the first three from radium, and radium from uranium.

Having learned this, we have also reason to suspect that many other elements are so being made. The astronomers who devote themselves especially to the study of the light given out by the heavenly bodies assure us that they find evidence of the same kind of thing going on in other worlds than ours. Apart from all this positive evidence—for some of it is now really positive and as certain as that coal will burn—we have the work which was begun by a great Russian chemist many years ago, showing us that the elements we know can all be arranged in groups according to a law which can only mean one thing—that they are related to each other in the closest way.

We have, therefore, to recognise something which at first may confuse us a little, and has, indeed, confused a great many people. We have already talked about the difference between an element and a compound, water being the best example of a compound, whilst oxygen and hydrogen, which form water, are good examples of elements. We have said that an element is made of atoms all of the same kind, while a compound is made by the union of atoms of different elements, two or more.

That is all true, and no one disputes it. But we have now learned the further truth that the elements themselves are made of atoms which are not simple, but are themselves compounded of simpler things. The word atom means the thing that cannot be cut. It is a very ancient word, going back hundreds of years before the birth of Christ. Little more than a century ago, a great Englishman, John Dalton, gave the word a new importance by his study of the way in which compounds like water are made, and showed that the atoms which the Greeks dreamed and guessed about must really exist. Everyone now agrees that there can be no doubt as to that. But since Dalton's time almost everyone has thought that an atom is what its name implies—a thing which cannot be cut or divided.

This would mean, of course, that the element—being made of atoms—was really an element; while if an atom could be divided, let us say, into two different parts, then the element would really be, after all, a sort of compound. It is not so long ago since some of the greatest chemists then living were quite certain that all

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atoms are simple things which cannot be divided up, or analysed, as we say, any farther. They were very definite and much too positive in what they said about atoms. They told us that all matter everywhere, on the earth and in the heavens, is made of these seventy-five or eighty different kinds of atoms; that these atoms can neither be made nor destroyed; that they are the everlasting stones of which the world is made; that they have existed unbroken and unworn since first they were minted by the hand of God; and that they go on exisiting without change or wear for ever.

THE MAKER AND SUSTAINER OF ALL THINGS IN THE WORLD

This was, after all, just the same idea of the way in which God works as men used to hold about the different kinds of animals and plants. They thought of God as a sort of great manufacturer or watchmaker, instead of thinking of Him as the Being to whom all the changes and life and movement of the world are due *now*, and have always been due. He did not make the world once upon a day, but He is ever and *now* making and changing and sustaining the world. It is He who works when radium gives birth to helium or neon.

Not until you have grown up and thought long about these wonderful questions can you see how immeasurably grander and more worthy of Him and of us is this idea of God and the way He works, than the idea that once He made the world as a man makes a clock, and that ever since He has been sitting in the clouds looking at it. If He is not everywhere He is nowhere; but He *is* everywhere. Some will say, perhaps, that these are not questions which should come into our story of the earth. But the most splendid and valuable thing about our knowledge of the earth to-day is that, while helping us in our ordinary life, it does lead us to a higher and wider and nobler idea of God.

THE REAL DIFFERENCE BETWEEN ONE ATOM AND ANOTHER

Now let us look more closely at the atom. We are quite sure now that atoms are themselves compound things, and the question, of course, is: what are they made of? For instance, are the atoms of oxygen made of parts which are peculiar to atoms of oxygen, and quite different from the parts which make up an atom of gold or an atom of hydrogen? If this were so, as it might be, then, even though we had found out the parts of which atoms are made, yet we should still have to accept the idea that all matter is made up of seventy-five or eighty different kinds, the brick we call a hydrogen atom being made up of smaller bricks or bricklets which were hydrogen bricklets and quite different from those making up any other kind of atom. Well, that is not what we find. On the contrary, we find that the parts which make up one kind of atom are exactly the same as the parts which make up a different kind of atom; only the number of these parts and the way in which they are arranged vary in different kinds of atoms, and that is what makes them different.

If we look first at the large atoms which have been most studied, especially the atoms of radium, we find that, as they break up—owing to reasons which we do not yet understand—they produce, among other things, smaller atoms.

HOW WE ARE FINDING OUT WHAT AN ATOM IS MADE OF

Now, that tells us a great deal about the relation between one kind of atom and another, but it does not tell us what an atom is really made of. However, there is something else produced when the radium atom breaks up, and it is this something else which has rightly attracted more attention and interest, during the last twelve years or so, than any other thing in the whole of Nature.

This thing, or rather these things—for they exist in countless numbers—do not belong only to the atom of radium, though they are more easily studied in radium, because it produces them quickly.

We are now learning that whenever and wherever we look for these things in the right way, we find them; not radium atoms only, but atoms in general produce them. The great group of metals, we learned some time ago, produce them in abundance. They are much more easily detected in some cases than in others, but as the years go on there remains little doubt that these things are being produced, slowly or quickly, by all kinds of matter everywhere. Indeed, we may now go a step farther, and say that matter is mainly, if not entirely, made of them. Only

thirty years ago it would have seemed absurd to ask what atoms are made of, and still more absurd to try to answer it. But now we can rightly ask this question, and have gone far towards answering it.

We have already seen that atoms are not permanent things, after all; but that, like everything else in the world, they change. It is in the course of this change, as we watch it, that we learn what atoms are made of. Whatever the kind of atom we study, whether radium, or some metal, or a gas, we find that in the course of its change it gives out from itself certain things which are all just like each other, and which are just the same, whatever kind of atom they come from. These things do not make up the whole atom, but they constitute a most important and essential part of it, and we cannot know too much about them.

WE MUST NOT LET THE GREAT MUDDLE OF WORDS MISLEAD US

But if we are to understand them, we must look at one or two words, for many of the words we use nowadays have rather muddled meanings. At a future time we shall have to study heat, and there we shall learn that this simple word, "heat," is used for two quite different things, though only the very wisest of those who study it have yet noticed how their word is deceiving them. Sitting opposite the fire, we feel it hot. Now, we know that it is because the fire is sending out certain waves, really just the same as light waves, but invisible to the eye, though felt by the skin. These are heat waves or rays, or radiant heat. They have no matter in them any more than light has, but, like light, are waves in the ether. But when we take a hot piece of matter, like a stone that has been lying in the sun, we say that there is heat in it; it feels warm to our fingers; and the heat in it is due to the radiant heat that has struck it.

But the heat of this stone is utterly different, though it feels the same to us, from the heat rays of sunshine. It is a state of to-and-fro movement of the atoms which make up the stone—a to-and-fro movement of matter. Yet at present, because only few have thought about this, and because the effect on our skin is much the same in both cases, we apply one and the same word, heat, to two wholly different things—a wave in the ether and a to-and-fro motion of the atoms of matter.

THE THINGS OF WHICH ATOMS ARE MADE ARE A KIND OF ELECTRICITY

Now, we have begun with this instance because it is a very striking one which anyone can understand, and because it is exactly the same as the use of another well-known word, electricity; and we are about to learn that the things which come out of breaking-up atoms, and of which atoms are made, are a kind of electricity. But we shall get into a sad muddle if we are not careful as to what we mean by that word. It has long been one of the most important words in science, but within the last ten years it has become a thousand times more important than ever before. If we use it wrongly, or do not know what we really mean by it, we shall make countless mistakes.

Long years ago it was found that if we rub a piece of amber—the beautiful yellow stuff of which the stems of pipes are often made—it will attract light things to it; and the force which acts in this way was called electricity, from *electron*, the Greek name for amber. That was merely a curiosity for a long time, but then electric forces were found elsewhere, and now we are all more or less familiar with the electric current. "Current" means *running*, and electricity is something which runs or moves. In the case of the amber attracting a piece of light wood, it is something that moves across the air between the amber and the wood. When we light our houses by means of the electric current, it is something that runs or moves along a wire. This something also runs along much longer wires when we send telegrams.

WHAT IS IT THAT RUNS THROUGH SPACE WHEN WE SEND A TELEGRAM?

Lately we have learned that wires are not necessary, but that whatever it is which runs will run through space without any wires at all. Every day now electric currents are being sent from this country to Europe, and from Europe to us. What is it, then, that runs or moves?

It is exactly like light—*a wave in the ether*. It is not conveyed by the air in wireless telegraphy, but by the ether which is everywhere, though we cannot

see it. Its waves are bigger waves than those of visible light, just as the sound waves made by a low note of the piano are bigger waves than those made by a high note. But electric waves are of exactly the same kind as light waves: they move in the same ether; they move at exactly the same rate; they follow exactly the same laws in all respects.

THE TWO KINDS OF WAVES THAT WE CALL ELECTRICITY

We think there is a great difference between the two kinds of waves because we can see the one sort and not the other. But that is merely due to the limitations of our eyes; indeed, it is due to just the same reason that prevents us from seeing the rays of radiant heat. Now, electric waves, heat waves, and light waves are all known to be essentially one and the same thing, just as the lowest note and the highest note on the piano, though they are so different, are both sound. We understand that because we have one sense, the ear, which tells us of both notes.

Now, we saw that the word heat is applied both to radiant heat or heat waves, and also to a particular state of the atoms of matter in which they are swinging to and fro in anything—a state which gives our skins much the same impression as radiant heat does. We must now learn that the word electricity is also used, at present, for two quite different things. This makes grave confusion, and leads to many mistakes. It cannot be defended, and it is a great pity that we should have to put up with this confusion. It will not always be so, but at present people are very careless about words, and we must just make the best of this muddle. Let us remember that electricity, like heat, means two quite different things. Now we shall see the importance of all this.

ELECTRONS, THE WONDERFUL THINGS THAT COME OUT OF ATOMS

The name given to the things which come out of atoms, and which make up atoms, is *electrons*. They are described as particles or *atoms of electricity*, and this last phrase, which will probably be more and more used, is the best example I know of the way in which words are apt to be muddled. Just think for a moment. The waves of wireless telegraphy are waves of electricity, just like waves of light. Now, a wave is not a *thing* exactly, but a *state* of something else. A wave of the sea is not one of the things that make the sea, but is *a state of the sea.* It is absurd to talk of an atom of a wave of any kind, and no one can talk of atoms of light. On the other hand, for a hundred years we have been using the word atom to mean the small units that make up the elements of matter; and now we are asked to use the same word in order to describe different things inside these atoms!

So we see that words are being used in two meanings. When we say that electrons are atoms of electricity, we mean that they are tiny particles of something which is not in the least like the electric waves that go across the Atlantic, any more than the heat of a stone is like the waves of radiant heat. But there is the best of all reasons in the world for calling these things atoms, if only we had not, when we knew less than we do now, used up this word for something else. Atom means a thing that cannot be cut, or divided, or split up. The chemical atoms, like an atom of oxygen or gold, were thought to answer to this description.

THE SIMPLEST FORM OF THE MATTER OF WHICH THE WORLD IS MADE

We know now that they do not. But this new kind of atoms, which are usually called electrons, and which go to make up what we have been calling atoms for so many years, are really worthy of the name. They are entitled to be called atoms, for they are really atomic; they *are* simple; they cannot be divided; they have no different parts in them; they answer exactly to what the word atom suggests.

Let us now look at some of their properties, meanwhile trying to remember that we are at last studying the matter of which the earth and the heavenly bodies are made, in its very simplest form. Wherever matter is, there these electrons are; they are in this page before us, in the air we breathe, in the sun and the stars. They are the true units, the real atoms of matter, and help us to understand the meaning of Tennyson, when he said that there must be "one element" of which all the various things we call elements are made.

The next story of the Earth begins on 1553.

THE STORY OF THE BIRDS

WE come now, in our story of Animal Life, to the great family of birds. Nature's richest gift to the animal world was the gift of flight to the reptiles which became birds. The hideous monsters that first began to fly, with great toothed beaks and scaly, tufted tails, have all perished. Some flying animals remain still, sailing on outstretched rafts of muscle; and there are fish in the ocean which, leaping from the waves, sail far and fast by the aid of wing-like fins. But true flight belongs only to the birds and the bats. The bats skulk through the air at nights as if ashamed of their strange performance; but the birds fill the air with life and song from early morning till the sun goes down, as if to show that nowhere beneath the clouds is there a place where Nature's children may not flourish and be happy.

BIRDS THAT CANNOT FLY

CONTINUED FROM 1382

ALTHOUGH we ourselves cannot fly, we are able, in a general way, to understand what happens when a bird flies. The wings of the bird displace the air with every beat they make. They force the air downwards and backwards. But every time the air resists before giving way; it resists all the time that it is being pressed by the wings, and that resistance of the air enables the bird to rise. It is the resistance of the water to our strokes that enables us to swim; it is the resistance of the water to the screw-propeller that causes the big ship to be driven through the waves; and it is the resistance of the air to the bird's wings when pressed down that causes the bird to rise in the air and to go forward.

In order that the bird may exert this downward and forward pressure it has enormous muscles. The muscles of the flying birds are far bigger, considering their size, than the finest muscle of a giant man. The strongest muscle of the bird is that which pulls the wings down. That is the flesh on the breast of the bird. It is attached to a breast-bone shaped like the keel of a ship. But when the wings have come down, they have to be drawn up again ready for the next stroke. This drawing up of the wings is done by two smaller muscles hidden in the flesh of the breast. The great muscle of the breast is also attached to the under side of the wings, to draw them down and to cause the bird to rise and go forward. The smaller muscles are continued into strong tendons which pass through a hole in each shoulder-joint, and are fixed to the upper side of the wings, so that these may be raised when the downward stroke has been made.

All these muscles work in turn to enable a bird to change the position of its wings so that it may catch the breeze, and sail or hover; or, of course, to turn in a new direction. When the wings are forced down, all the feathers are spread out flat to prevent the air from passing between them; but when the wings are being raised, the feathers open out to let the air pass through, so preventing the bird from being tired by too great an effort to force up its wings against the pressure of the air. Thus we see that the action of a bird's wings is controlled by the most wonderful and perfect living machinery.

There are other aids to flying which a bird possesses. It has an oil-gland from which it draws oil to lubricate its feathers. This is specially valuable to sea birds, which must have their feathers water-tight; but it is of service to the birds of the air also, for the oil upon their feathers makes them less porous, and causes them to offer a greater resistance to the air when they are making the important downward-forward stroke.

Another important thing is the system of air-vessels, or air-sacs, with which a bird is provided. The bird has huge lungs, but beyond these run the air-sacs, some birds having them

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continued right into their bones. It was at one time supposed that these sacs were filled with gas, to make the bird light, as gas makes a balloon light. That is not the fact. These air-sacs do help to make the bird lighter, but not through gas. The air in them is warmed by the great heat of the bird's body, and as hot air is lighter than cold air, so the presence of a quantity of warmed air in the body of the bird must help to sustain it in its flight.

BIRDS THAT CANNOT FLY, AND ARE SLOWLY DISAPPEARING

Seeing how great is the perfection to which flying birds have attained, so that they can fly from country to country in the course of a single night, and race the fastest ships and trains, we may wonder that all birds do not fly. Some, however, forgot how to fly so long ago that there is now very little evidence of their ever having flown.

The greatest of all birds, the moa, which lived chiefly in New Zealand, but also to some extent in Australia, had no wings at all. There are no moas left alive now. They were hunted by the natives until not one moa survived. They were plentiful up to the middle of the eighteenth century, and some natives of New Zealand, who were in England fifty years ago, told stories of their grandfathers having hunted the giant bird. There were some small varieties of moas, but the giants of the family were fourteen to sixteen feet high—taller than the tallest elephant, and as tall as a good-sized giraffe. They had enormously thick legs and toes, the bones being like those of an elephant. But they are all gone, and the other birds which cannot fly are in danger of following them into extinction. Madagascar's great bird, the æpyornis, which laid an egg a yard in length and two feet six inches round, which could hold more than two gallons, is, like the moa, as dead as the dodo.

HOW THE FLIGHTLESS BIRDS LOST THE USE OF THEIR WINGS

It is probable that all the great flightless birds of our day descended from birds which could fly, though there are in the wing of the ostrich the slender claws of a limb which suggest that the ostrich's wings were, once upon a time, not wings at all, but the supports of a four-footed animal. Be that as it may, there is little doubt that the moa, the ostrich, the cassowary, the apteryx, the rhea, the emu, and the penguin all started fairly like the other birds, and had their chance with them. But early in their history we find the old story repeated.

Most birds had to fly to pursue their food, or to escape flesh-eating enemies. They had a hard life of it then, and, making the best of it, they gradually developed wings and learned to fly. The birds which do not fly descend from birds which found pleasanter quarters, where food was abundant on the ground, and where there were no savage beasts to kill them. Although they had learned to fly, they had now no need to do so. They neglected the use of their wings.

Slowly, in the course of long ages, the wings lost their power to raise them above the ground. The wings got smaller and smaller, until to-day, in the case of the ostrich, they serve only to balance the bird as it runs, in the same way that hands serve to balance us when we walk and run.

THE OSTRICH, WHICH RUNS LIKE AN EXPRESS TRAIN INSTEAD OF FLYING

When we think of this we must remember that the wings of all birds, big or little, flying or flightless, are only hands which have been changed into wings. They had arms, and wrists, and hands, and fingers, just as we have. But these changed and became covered with feathers, to form the wonderful instruments which carry the flying birds up into the clouds.

The most famous of the birds which do not fly now alive is the ostrich, because it is the biggest, and gives the best feathers. It differs from the other big birds because these have three toes—indeed, one has four—while the ostrich has only two toes. Its home is in Africa and Arabia, but it used to live in India, and the egg of one has been discovered, very, very old, in Southern Russia. The height of the ostrich is between six and eight feet, the neck being long and flexible. When wild, it shuns men, and prefers the company of giraffes and zebras and deer. As it has lost the power of its wings, it has developed the power of its legs. These are very thick and strong. When it begins to run, it races away like an express train, at the rate of

SOME BIRDS THAT FORGOT HOW TO FLY

A living specimen of any of these birds would be worth a fortune. The huge bird is the extinct moa. It was taller than an elephant. The bird which looks like an emu is the extinct æpyornis. Its egg would hold two gallons. The penguin-like bird is the great auk. There is not now one living in all the world. The dodos lived and died in Mauritius, where sailors ate them. They were the biggest pigeons in the world, larger than a swan. The solitaire looks like a tiny-winged goose, but was a pigeon. All these birds forgot how to fly, and perished.

sixty miles an hour. Of course, it cannot keep this up, but even when its first freshness has worn off it can outrun a good horse, unless the man upon the horse's back knows how to hunt it.

THE SILLY STORIES OF THE OSTRICH TOLD IN THE SCHOOL BOOKS

The ostrich does not run straight, but in curves, so the hunter, by taking short cuts, can get up to it. Then the ostrich, if it be a male, will fight. Its feet are its weapons. You may judge how strong are its feet and legs when you know that the ostrich can carry two men on its back. It strikes forward with its feet, and can inflict a terrible injury. This shows us how unreal are the stories in the school books of the ostrich running away and burying its head in the sand as soon as it sees an enemy, believing that because it cannot see neither can it be seen. The ostrich does no such thing; nor does it leave its eggs to be hatched by the sun.

Stupid the ostrich may be, but it makes a very good parent. Three or four hens lay their eggs together in a rough nest, which is made simply by a hollow in the sand. The ostrich's egg is very big, but the male ostrich is a big bird, and can cover sixteen of them. If there be more than that, he simply pushes them out of the nest, and frequently more wasted eggs are found lying about the nest than have been hatched. The hatching lasts forty-two days. The birds do not leave the eggs in the sand. The male sits on them throughout the night, and the hen sits on them during the day. Sometimes the hen may cover the eggs over with sand, and leave them in the sunshine for a few hours during the day, but this rarely happens.

WHEN THE YOUNG OSTRICHES COME OUT OF THE EGGS AND BEGIN TO EAT STONES

The birds have sense enough to know that if left unprotected the eggs would be fried or boiled by the sun, so they use sand as a shield when leaving them. When the chicks are hatched, they eat nothing but a few stones for the first two or three days. When they are able to run about, the father bird guards them affectionately.

Many ostriches are tamed and kept on ostrich farms, in Africa, in Southern France, and in California. The big ostriches are wanted for their feathers. At certain periods of the year the birds are collected together, and taken one by one into big yards to have some of their feathers removed. Eighteen or twenty long white feathers are cut from each wing; then eight or nine fancy feathers, and a few long black ones, and some short feathers. The bird suffers no pain. If it did, it would take a fever and die. Nor are more feathers removed than the ostrich can spare, for in that case the bird would be cold, and die. The business of the ostrich farmer is to keep his birds in good health, and it pays him to be kind.

Ostriches are to be seen in nearly all the zoological gardens. There they eat the most extraordinary things. One ostrich, which died, was found to have swallowed many large stones, seven nails, a scarf-pin, an envelope, thirteen copper coins, a silver coin, fourteen beads, two small keys, a part of a handkerchief, a silver medal, and a small metal cross. This one did not die from what it had eaten, but one which swallowed part of a parasol did.

THE RHEA BIRD, WHICH STOLE PART OF A RAILWAY IN SOUTH AMERICA

A bird which much resembles the ostrich is the rhea. It has three toes, but is so like the other bird that it is called the South American ostrich. It lives only in South America. In nothing else does it more resemble the ostrich than in its appetite. It will eat almost anything which can be picked up. When a railway was being built in the wilds of South America, there was quite a famine of steel nuts and bolts; the rheas used to creep up to the works and steal all that they could find. Of course, in such a big place as South America, the rheas are not all alike. Some lay quite small eggs; others lay large eggs. Some have horny crests to the head, like the cassowary.

When the families of the rheas are being made up, they have battles, like the giraffes. The young males are driven away, then the old ones fight among themselves for the females which they desire to possess. They twist their long necks together, and bite as hard as they can, kicking and stamping all the while, as they prance round in a circle. When an ostrich kicks an ostrich, or when a rhea kicks a rhea, not much damage is done. Use and nature have made them ready for such treatment.

THE OSTRICH, WHICH CAN RACE A HORSE

Ostriches gained their present shape when there were no enemies from which they could not escape by running. They never learned to fly. They can run faster than a horse ; but their wings are small, and serve only to balance the body as they race over the ground. The ostrich has at the end of its wing-bones two slender claws, which are believed to be remnants of front limbs which its ancestor had when it existed as a four-legged animal.

The kicks of these birds do most damage to different types of creatures. When the battles are over, and all is peace, the female rheas lay their eggs in holes, like those made by ostriches. In a single nest all the eggs of the party are laid, or as many as the male bird permits. If the male bird be good-tempered, scores of eggs will be deposited. In one instance, over a hundred eggs were found in the same nest. Of course, not nearly all these can be hatched in one nest, so generally the male rhea drives away the hens before they have finished laying. Then he sits on the eggs till they are hatched.

When hatched, the young rheas are often in peril from eagles and other big birds of prey, which swoop down to carry them off. But the male rhea is a watchful as well as loving father. As soon as he sees a bird of prey appear in the sky, he crouches down and utters a snorting cry. The young ones rush to him for protection, and he shelters them under his wings.

THE CASSOWARY THAT CAME FROM THE FOREST AND FOUGHT TWO BLOODHOUNDS

A near relation of the rhea and ostrich is the cassowary, a flightless bird five feet high. Upon its head is a crest of horn, and at the sides of the face are coloured wattles, which make its appearance, so far as the head is concerned, more attractive than that of the ostrich. It has, however, not the rich plumage of the ostrich, but feathers which are more like hair. Upon its stumpy wings are five spiny quills, and the cassowary strikes with these when it fights. But its strong, three-toed feet are its chief weapons.

Not long ago, a gentleman was resting in the middle of the day near a forest in New Guinea, when a cassowary stalked forth. Two big bloodhounds which he had with him immediately attacked the bird, but it was not in the least afraid of the powerful brutes. It struck out left and right with its terrible feet, and soon stretched one of the hounds dead upon the ground. The other hound tore open the flesh of the cassowary's breast, but the bird continued to fight, and would have killed the dog, too, had not the man at last succeeded in putting an end to the fight. Being a kind man, the traveller stitched up the wound of the cassowary, gave it a good meal, and let it go. It went quietly back to the forest as if none the worse for its battle.

HOW THE FATHER AND MOTHER EMU BIRDS ATTEND TO THEIR LITTLE ONES

Australia has a cassowary called the emu, which, though its body resembles that of the other, has no helmet and no coloured wattles. But it has a feathered neck and head, which these other big birds have not. It is about six feet high when full grown. The male emu has only one mate. She lays about forty eggs in the course of the summer, but the male bird does not wait until all these have been laid. He makes a nest and sits on it as soon as the first batch of eggs is ready. The hen continues to lay, and then she sits on the rest. Meanwhile, the male emu has hatched the first batch, and is able to look after the little ones while the mother bird hatches the rest. In spite of their many eggs, the rheas and cassowaries are getting very scarce. A cruel man with a rifle can, in the course of a day, shoot many parent birds and their broods.

The nearest resemblance remaining to us to-day of the great moa is the apteryx, or kiwi, shown on page 1431. It is a bird which has no tail, and scarcely any wings, but has thick legs and four-toed feet, with which it can kick with great force. The stout claws on three of the toes make these weapons still more powerful.

THE KIWI BIRD, THE DODO, AND THE GREAT AUK

This bird never grows to more than three feet in height, and it is not a quarter the size of the moa. It differs in this respect, too—it has a long, thick beak. Its nostrils are not at the base of the beak, as is the case with other birds, but just near the tip. This is to enable it to smell its food. It lives upon worms and grubs, and insects and berries; and, though it comes out only in the dark, its presence can be detected by the sniffing noise it makes in seeking its food. The apteryx lays an enormous egg.

The dodo and the great auk were flightless birds, which became extinct in comparatively modern times. There were thousands of dodos in Mauritius until the Dutch settled there. The dodo was a pigeon, as big as a turkey, but could not escape when enemies attacked it,

THE COUSINS OF THE OSTRICH

The cassowary lives in Australia and New Guinea. Its glossy feathers are like hair, and its head is crowned with a helmet. The male is smaller than the female.

The emu is a kind of cassowary. Its neck is feathered, not bare like the cassowary's. The female emu is bigger and fiercer than the male.

South America's ostrich is called the rhea. It has three toes; the African ostrich has only two. The rhea has no tail, but it has larger wings than the ostrich. Its feathers are used for making brushes. Those of the ostrich are more valuable, and the ostrich is carefully reared by ostrich farmers for the sake of its feathers These big birds have strange appetites, and eat all sorts of things from screws to broken bottles and seem none the worse.

owing to the smallness and weakness of its wings. It was good for food, so the settlers ate the big birds, while their dogs and pigs destroyed the little ones and their eggs. To-day, even the skin and feathers of a dodo would be worth a fortune. A complete specimen of the great auk would be nearly as valuable. The great auk was a bird which lost its power to fly and developed wings that could be used as paddles in the sea. There were millions of great auks in northern parts of the world, but men killed them all, and to-day an auk's empty eggshell is worth hundreds of pounds.

We shall probably see another of the flightless birds disappear as these others have done. The penguin, the curious sea bird which marches upright, with little paddles for wings, is slain in hundreds of thousands. Its home is in the Antarctic regions, where it nests on the ground in companies; but all its food is caught in the sea. There is no doubt that once upon a time it could fly as well as any other sea bird.

THE COMICAL PENGUIN, WHICH USES ITS WINGS TO SWIM WITH

But ages and ages of neglect to use the power to fly brought the usual result. The form and purpose of the wing became changed. Instead of long feathers for flying, the penguin's wing now has only short, scaly feathers. It cannot be moved and doubled, as can that of a flying bird.

The penguin can walk on land, slowly, and with stately step, which gives it the most comically grave appearance; but to swim is its easiest way. Once on the water it stretches out its legs behind it, and works its wings, one after another, as a man in his canoe works his paddle. The penguin would never have forgotten how to fly had it had enemies in the beginning as it has now, men who can go in ships to the lonely islands where it breeds.

Through long ages of safety it has become a stupid bird, and fearlessly lets a man approach. When he gets up to it, it may give him a peck severe enough to make him glad to put on leggings; but what is a peck on the leg to a man who has a gun or a stick with which he can knock down as many birds as he wants? He gets oil from the body of the bird, and sells the plumes about its neck to furriers, who make them into various articles of dress for women to wear.

In some parts of the world the penguin is protected by law, but in others cruel men kill it at such a rate that soon the penguin colonies will be desolated, as are the haunts of the moa, the dodo, and that other great wingless, dodo-like bird, the solitaire.

WHY THE FLIGHTLESS BIRDS CAN NEVER FLY AGAIN

If birds could live through millions of years of persecution, doubtless ostriches and their cousins, and the penguins, and the kakapo, or owl-parrot, of New Zealand, which can climb but not fly, and the steamer-duck, which can swim but not fly, and the New Zealand wood-hen, another of the flightless birds — doubtless all these would develop into flying birds. But there is no chance of that now. The flightless birds have lost that keel-like bone in the breast which all the flying birds have. It takes too long for a bird or an animal now to make so great a bodily change as this, and men's habitations spread so rapidly about the earth that the place of these great wild birds will soon know them no more.

Long, long ago, these birds chose the easy life where no enemies were, and now, poor things, they are paying the penalty with their lives.

It is very sad, for there are other birds which are slowly losing their flying powers. The hoatzin, a strange South American bird, which lives always in trees overhanging water, has been so long without occasion to fly that it can now only flutter a little way.

THE WONDERFUL POWER OF THE LITTLE BABY HOATZIN BIRDS

It is interesting because, when a chick, the hoatzin still has claws on its wings, like the first reptile birds had millions of years ago. With these, the tiny young ones can climb up the sides of the nest so as to receive the food which their parents bring.

When the wings grow long enough for the little one to flutter alone, the claws disappear. Should the baby hoatzin by any accident fall into the water, it dives and swims from danger in a marvellous way. So far as is known, the adult hoatzin cannot swim. It is rather a helpless bird when it grows up—all through living too easy a life.

The next stories of Birds are on page 1513.

BIRDS THAT RUN, SWIM, OR CLIMB

The kiwi, or apteryx, cannot fly, but it kicks with surprising power. Its home is New Zealand. It comes out only at night, and digs up food with its long beak.

The black wood-hen, or weka rail, of New Zealand, cannot fly, but can run fast along the ground. It hates the sight of red, and will fight wildly if it sees this colour.

The wing of the penguin has become simply a flipper or paddle, and the bird cannot fly. When on land penguins walk upright and clumsily. They suffer dreadfully from the hunters, who want them to boil down for oil. They leave the sea for the land to lay their eggs, and are then slain in thousands. They are most at home in water.

The hoatzin flies with difficulty. The young ones have claws on their wings before the feathers come, and they can climb. They can swim and dive, too, but not when they grow up. It is a living fossil among birds.

The kakapo, or owl-parrot, long led such an easy life in New Zealand that it ceased to fly. Now it must climb trees like four-footed animals, and come out early at night for its food. Its colour is greenish and brown.

The photographs in these pages are by Lewis Medland and others

THE FAIRY'S REVENGE

An old shepherd was playing on a flute one morning as he watched his sheep on the marshlands outside Rome, and he played so sweetly that a lovely fairy came and listened to him.

"Will you marry me, and come and play to me in my castle under the earth?" she said.

"Yes, yes, lovely lady!" said the shepherd. She put a ring on his finger, and he at once became a handsome youth dressed in princely robes.

"But I must first go to Rome and bid farewell to my friends and relatives," he said.

The fairy gave him a golden coach and twelve white horses, and as he rode in state to Rome he met the young and unmarried Queen of Italy. She was struck by his wonderful beauty, and invited him into her palace. The shepherd saw that he had won the queen's heart, and he resolved to marry her and become King of Italy, and let the fairy go. So when he and the queen were alone together, he knelt down and took her hand, saying:

"Marry me, dearest, and I will help you to govern Italy."

But as soon as he spoke he turned into an old, ugly, and ragged shepherd.

"What is this horrible beggar doing here?" cried the queen. "Whip him out of the palace."

And this was done. The miserable shepherd went back to the marshlands to find the fairy, but she never came to him again, and so he remained a shepherd.

THE MINSTREL QUEEN OF SPAIN

A long time ago the fierce Moors invaded Spain, and defeated the Spaniards and captured their king. The lovely Queen of Spain at once dressed herself in boy's clothes and went to the tent of the Moorish chieftain, and sang to him as he sat feasting.

"What a divine voice!" said the Moor. "Boy, you shall have a royal footstool!"

He forced the King of Spain down on the ground, and the singer put her feet softly on his neck. When the singing was done, the Moor cried:

"Boy, you sing like an angel! Ask what you will, and I will grant it."

"Let me take this young king back to his people," said the singer.

Her request was granted, so she led the king into the northern mountains, and there they met the Spanish Minister.

"Sire, you must marry again," he said. "Your queen has joined our enemies."

A feast was held, and the cunning Minister put his daughter next to the king, and she made love to him. But the king turned sadly away from her, and said to the singer:

"Boy, sing me something merry."

And the singer sang:

"Down the hills and along the plain,
Lute in hand went the Queen of Spain,
Dressed in the clothes of a boy she went
And sang in the Moorish chieftain's tent.
He gave her a footstool fair and strong,
And she won the footstool with a song."

The King of Spain then recognised his wife. He took her tenderly in his arms, and had the cunning Minister punished. In the end the Moors were defeated and driven out of Spain.

THE CHOICE OF MARPESSA

Marpessa was the loveliest of all the princesses of ancient Greece, and she was wooed by Idas, a noble young hero, and Apollo, the radiant "god of the sun." Idas was the bolder lover, and one day he carried Marpessa away in his chariot; but Apollo then came down from the sky and stopped him, and Marpessa then had to choose between the man and the god. Apollo was more beautiful than Idas, and he felt sure that Marpessa would marry him; but Marpessa said, "No, Apollo! You are immortal, and will remain ever young and happy. But Idas will grow old as I grow old, and share my troubles, and cherish and comfort me."

So she married Idas, and they lived as happily together in their old age as they did in the flower of their youth; and they had many tall, handsome children to love and help them in the decline of their life.

JOHN RUSKIN'S FAIRY STORY

JOHN RUSKIN was one of the wisest and cleverest men who ever lived. He was a writer of beautiful books, an artist, and a teacher. He had a great passion for truth and gentleness, and a great hate of anything unjust and false. We read in another part of our book of the life of John Ruskin, and of what he believed and taught. But once during his life John Ruskin did an odd thing : he wrote a fairy tale to please a girl friend who had come to stay at his home. It seemed to her that so wise a man could not write a simple fairy tale, but Mr. Ruskin's fairy tale, which he sat down to write on one day and finished on the second day, is one of the finest tales in the world, and shows us how much truth and wisdom can be put into a simple story. The story begins in these pages and ends on page 1534. It is not quite all given here, but the little left out does not make any difference.

THE KING OF THE GOLDEN RIVER

CONTINUED FROM 1320

IN a secluded and mountainous part of Styria there was, in old time, a valley of the most surprising and luxuriant fertility. It was surrounded on all sides by steep and rocky mountains, rising into peaks, which were always covered with snow, and from which a number of torrents descended in constant cataracts. One of these fell westward, over the face of a crag so high that when the sun had set to everything else, and all below was darkness, his beams still shone upon this waterfall, so that it looked like a shower of gold. It was therefore called, by the people of the neighbourhood, the Golden River.

It was strange that none of these streams fell into the valley itself. They all descended on the other side of the mountains, and wound away through broad plains and by populous cities. But the clouds were drawn so constantly to the snowy hills, and rested so softly in the circular hollow, that in time of drought and heat, when all the country round was burnt up, there was still rain in the little valley; and its crops were so heavy, and its hay so high, and its apples so red, and its grapes so blue, and its wine so rich, and its honey so sweet, that it was a marvel to everyone who beheld it, and was commonly called the Treasure Valley.

The whole of this little valley belonged to three brothers,called Schwartz, Hans and Gluck. Schwartz and Hans, the two elder brothers, were very ugly men, with overhanging eyebrows and small, dull eyes, which were always half shut, so that you couldn't see into *them*, and always fancied they saw very far into *you*.

They lived by farming the Treasure Valley, and very good farmers they were. They killed everything that did not pay for its eating. They shot the blackbirds, because they pecked the fruit; and killed the hedgehogs, lest they should suck the cows; they poisoned the crickets for eating the crumbs in the kitchen; and smothered the cicadas, which used to sing all summer in the lime-trees. They worked their servants without any wages, till they would not work any more, and then quarrelled with them, and turned them out of doors without paying them.

It would have been very odd if, with such a farm and such a system of farming, they hadn't got very rich; and very rich they *did* get. They generally contrived to keep their corn by them till it was very dear, and then sell it for twice its value; they had heaps of gold lying about on their floors, yet it was never known that they had given so much as a penny or a crust in charity; they were of so cruel and grinding a temper as to receive, from all those with whom they had any dealings, the nickname of the "Black Brothers."

The youngest brother, Gluck, was as completely opposed, in both appearance and character, to his seniors as could possibly be imagined or desired. He was not above twelve years old,

fair, blue-eyed, and kind in temper to every living thing. He did not, of course, agree particularly well with his brothers, or rather they did not agree with *him*. He was usually appointed to the honourable office of turnspit, when there was anything to roast, which was not often; at other times he used to clean the shoes, the floors, and sometimes the plates, occasionally getting what was left on them, by way of encouragement, and a wholesome quantity of dry blows, by way of education.

Things went on in this manner for a long time. At last came a very wet summer, and everything went wrong in the country around. The hay had hardly been got in, when the haystacks were floated bodily down to the sea by a flood; the vines were cut to pieces with the hail; the corn was all killed by a black blight; only in the Treasure Valley, as usual, all was safe. As it had rain when there was rain nowhere else, so it had sun when there was sun nowhere else.

It was drawing towards winter, and very cold weather, when one day the two elder brothers had gone out, with their usual warning to little Gluck, who was left to mind the roast, that he was to let nobody in, and give nothing out. Gluck sat down quite close to the fire, for it was raining very hard, and the kitchen walls were by no means dry or comfortable looking. He turned and turned, and the roast got nice and brown.

"What a pity," thought Gluck, "my brothers never ask anybody to dinner! I'm sure, when they've got such a nice piece of mutton as this, and nobody else has got so much as a piece of dry bread, it would do their hearts good to have somebody to eat it with them."

Just as he spoke there came a double knock at the house door, yet heavy and dull, as though the knocker had been tied up—more like a puff than a knock.

"It must be the wind," said Gluck; "nobody else would venture to knock double knocks at our door."

No; it wasn't the wind: there it came again very hard, and, what was particularly astounding, the knocker seemed to be in a hurry, and not to be in the least afraid of the consequences. Gluck went to the window, opened it, and put his head out to see who was standing there in the rain.

It was the most extraordinary-looking little gentleman he had ever seen in his life. He had a very large nose, slightly brass-coloured; his cheeks were very round, and very red, and might have warranted a supposition that he had been blowing a fire for the last eight-and-forty hours; his eyes twinkled merrily through long silky eyelashes, his moustaches curled twice round like a corkscrew on each side of his mouth, and his hair, of a curious mixed pepper-and-salt colour, descended far over his shoulders. He was about four feet six in height, and wore a pointed cap of nearly the same height, decorated with a black feather some three feet long.

Gluck was so perfectly paralysed by the singular appearance of his visitor, that he remained fixed without uttering a word until the old gentleman turned round to look after his fly-away cloak. In so doing he caught sight of Gluck's little yellow head jammed in the window.

"Hollo!" said the little gentleman, "that's not the way to answer the door; I'm wet, let me in."

To do the little gentleman justice, he *was* wet. His feather hung down between his legs like a beaten puppy's tail, dripping like an umbrella; and from the ends of his moustaches the water was running into his waistcoat pockets, and out again like a mill stream.

"I beg pardon, sir," said Gluck, "I'm very sorry, but I really can't."

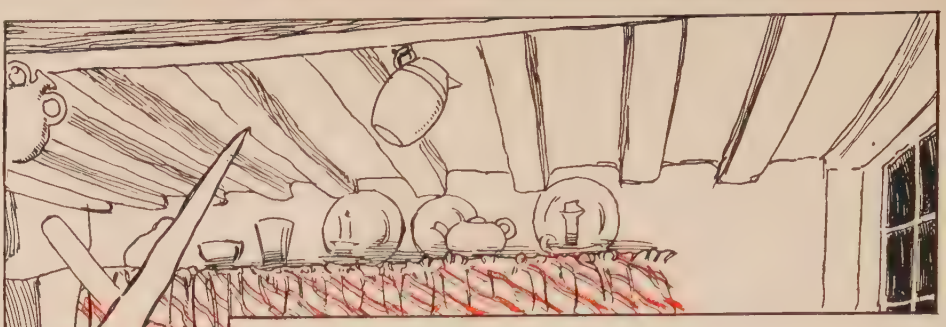
"Can't what?" said the old gentleman.

"I can't let you in, sir—I can't indeed; my brothers would beat me to death, sir, if I thought of such a thing. What do you want, sir?"

"Want?" said the old gentleman petulantly. "I want fire and shelter; and there's your great fire there blazing, crackling, and dancing on the walls, with nobody to feel it. Let me in, I say; I only want to warm myself."

Gluck had had his head, by this time, so long out of the window, that he began to feel it was really unpleasantly cold, and when he turned, and saw the beautiful fire rustling and roaring, and

The old gentleman went on drip, drip, dripping among the cinders, and his cloak ran like a gutter. "May n t I take your cloak?" said Gluck. "No, I'm all right, thank you," said the old gentleman rather gruffly.



throwing long, bright tongues up the chimney, as if it were licking its chops at the savoury smell of the leg of mutton, his heart melted within him that it should be burning away for nothing.

"He does look very wet," said little Gluck; "I'll just let him in for a quarter of an hour."

Round he went to the door, and opened it; and as the little gentleman walked in, there came a gust of wind through the house that made the old chimneys totter.

"That's a good boy," said the little gentleman. "Never mind your brothers. I'll talk to them."

"Pray, sir, don't do any such thing," said Gluck. "I can't let you stay till they come; they'd be the death of me."

"Dear me," said the old gentleman, "I'm very sorry to hear that. How long may I stay?"

"Only till the mutton's done, sir," replied Gluck, "and it's very brown."

Then the old gentleman walked into the kitchen, and sat himself down on the hob, with the top of his cap accommodated up the chimney, for it was a great deal too high for the roof.

"You'll soon dry there, sir," said Gluck, and sat down again to turn the mutton. But the old gentleman did not dry there, but went on drip, drip, dripping among the cinders, and the fire fizzed, and spluttered, and began to look very black and uncomfortable: never was such a cloak; every fold in it ran like a gutter.

"I beg your pardon, sir," said Gluck at length, after watching the water spreading in long, quicksilver-like streams over the floor for a quarter of an hour; "mayn't I take your cloak?"

"No, thank you," said the old gentleman.

"Your cap, sir?"

"No, I am all right, thank you," said the old gentleman rather gruffly.

"But, sir, I'm very sorry," said Gluck hesitatingly; "but really, sir, you're putting the fire out."

"It'll take longer to do the mutton, then," replied his visitor drily.

Gluck was very much puzzled by the behaviour of his guest; it was such a strange mixture of coolness and humility. He turned away at the string meditatively for another five minutes.

"That mutton looks very nice," said the old gentleman at length. "Can't you give me a little bit?"

"Impossible, sir," said Gluck.

"I'm very hungry," continued the old gentleman. "I've had nothing to eat yesterday, nor to-day. They surely couldn't miss a bit from the knuckle."

He spoke in so very melancholy a tone that it quite melted Gluck's heart. "They promised me one slice to-day, sir," said he; "I can give you that, but not a bit more."

"That's a good boy," said the old gentleman again.

Then Gluck warmed a plate, and sharpened a knife.

"I don't care if I do get beaten for it," thought he. Just as he had cut a large slice out of the mutton, there came a tremendous rap at the door. The old gentleman jumped off the hob, as if it had suddenly become inconveniently warm. Gluck fitted the slice into the mutton again, with desperate efforts at exactitude, and ran to open the door.

"What did you keep us waiting in the rain for?" said Schwartz, as he walked in, throwing his umbrella in Gluck's face. "Ay! what for, indeed, you little vagabond?" said Hans, giving Gluck a box on the ear.

"Bless my soul!" said Schwartz, when he opened the door.

"Amen," said the little gentleman, who had taken his cap off, and was standing in the middle of the kitchen, bowing with the utmost possible velocity.

"Who's that?" said Schwartz, catching up a rolling-pin, and turning to Gluck with a fierce frown.

"I don't know, indeed, brother," said Gluck, in great terror.

"How did he get in?" roared Schwartz.

"My dear brother," said Gluck deprecatingly, "he was so *very* wet!"

The rolling-pin was descending on Gluck's head; but, at the instant, the old gentleman interposed his conical cap, on which it crashed with a shock that shook the water out of it all over the room. What was very odd, the rolling-pin no sooner touched the cap than it flew out of Schwartz's hand, spinning like a straw in a high wind, and fell into the corner at the further end of the room.

"Who are you, sir?" demanded Schwartz, turning upon him.

"What's your business?" snarled Hans.

"I'm a poor old man, sir," the little gentleman began very modestly, "and I saw your fire through the window, and begged shelter for a quarter of an hour."

"Have the goodness to walk out again, then," said Schwartz. "We've quite enough water in our kitchen, without making it a drying-house."

"It is a cold day to turn an old man out in. Look at my grey hairs."

"Ay!" said Hans, "there are enough of them to keep you warm. Walk!"

"I'm very hungry, sir; couldn't you spare me a bit of bread before I go?"

"Bread, indeed!" said Schwartz. "Do you suppose we've nothing to do with our bread, but to give it to such red-nosed fellows as you?"

"Why don't you sell your feather?" said Hans sneeringly. "Out with you!"

"A little bit," said the old gentleman.

"Be off!" said Schwartz.

there they lay, all three. Then the old gentleman spun himself round, and replied with perfect coolness: "Gentlemen, I wish you a very good morning. At twelve o'clock to-night I'll call again; after such a refusal of hospitality as I have just experienced, you will not be surprised if that visit is the last I ever pay you."

"If ever I catch you here again," muttered Schwartz, coming, half frightened, out of the corner——but, before he could finish his sentence, the old gentleman had shut the house

SCHWARTZ AND HANS, THE TWO ELDER BROTHERS, ATE AS MUCH MUTTON AS THEY COULD

"Pray, gentlemen."

"Off, and be hanged!" cried Hans, seizing him by the collar. But he had no sooner touched the old gentleman's collar than away he went after the rolling-pin, till he fell into the corner on the top of it. Then Schwartz was very angry and ran at the old gentleman to turn him out; but he also had hardly touched him, when away he went after Hans and the rolling-pin, and hit his head against the wall as he tumbled into the corner. And so

door behind him with a great bang; and there drove past the window, at the same instant, a wreath of ragged cloud, that whirled and rolled away down the valley in all manner of shapes, melting away at last in a gush of rain.

"A very pretty business, indeed, Mr. Gluck!" said Schwartz. "Dish the mutton, sir. If ever I catch you at such a trick again—— Bless me, why, the mutton's been cut!"

"You promised me one slice, brother, you know," said Gluck.

"I want fire and shelter," said the old gentleman, "and there's your great fire there blazing, crackling, and dancing on the walls, with nobody to feel it. Let me in, I say: I only want to warm myself."

"Oh, and you were cutting it hot, I suppose, and going to catch all the gravy. It'll be long before I promise you it again. Leave the room, sir."

Gluck left the room melancholy enough. The brothers ate as much mutton as they could, locked the rest in the cupboard, and proceeded to get very drunk after dinner.

Such a night as it was! Howling wind, and rushing rain, without intermission. The brothers had just sense enough left to put up all the shutters, and double bar the door, before they went to bed. As the clock struck twelve, they were both awakened by a tremendous crash. Their door burst open with a violence that shook the house from top to bottom.

"What's that?" cried Schwartz, starting up.

"Only I," said the little gentleman.

The brothers stared into the darkness. The room was full of water, and they could see in the midst of it an enormous foam globe, spinning round, and bobbing up and down like a cork, on which reclined the little old gentleman, cap and all. There was plenty of room for it now, for the roof was off.

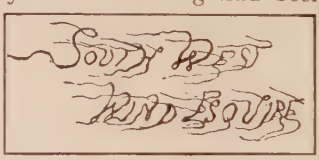
"Sorry to incommode you," said their visitor ironically. "I'm afraid your beds are dampish. Perhaps you had better go to your brother's room. I've left the ceiling on there."

They required no second admonition, but rushed into Gluck's room, wet through, and in an agony of terror.

"You'll find my card on the kitchen table," the old gentleman called after them. "Remember, the last visit."

"Pray Heaven it may be!" said Schwartz, shuddering. And the foam globe disappeared.

Dawn came at last, and the two brothers looked out of Gluck's little window in the morning. The Treasure Valley was one mass of ruin and desolation. The flood had swept away trees, crops and cattle, and left in their stead a waste of red sand and grey mud. The two brothers crept, shivering and horror-struck, into the kitchen. The water had gutted the whole first floor—corn, money, almost every movable thing had been swept away, and there was left only a small white card on the kitchen table. On it, in large, breezy, long-legged letters, were engraved the words:



THE NEXT PART OF THIS STORY BEGINS ON PAGE 1526

WHAT THIS STORY TELLS US

WE have read the story of the red cells that carry the air from the lungs to every part of the body, and in these pages we learn about cells more wonderful still, more intensely alive and active, which protect us from our enemies—about the scavenger cells, which clear away dirt and waste matter, and the soldier cells, which fight and kill dangerous microbes whenever and wherever they enter the body. It is in these white cells that there lies what was long ago called the "healing power of Nature." Also we learn here about the gases in the blood, and especially about the carbonic acid gas, which is carried by a special salt from every part of the body to the lungs, and then got rid of. In five minutes, if this were not being done, we should die—poisoned by this gas which we must make, and must get rid of, if we are to live. We learn here also about the food in the blood, and the things in it that carry messages, and others that help the white soldier cells to kill the evil microbes.

THE WHITE CELLS OF THE BLOOD

CONTINUED FROM 1386

NOW we must pass to the other kind of cells in the blood—the white cells, about which a little has already been said, since many of them really look very like the pond amœba. These are very few in the blood compared with the red cells. A volume of blood equal to two pins' heads, which should contain some four or five millions of the red cells, should contain only about eight thousand of the white cells—that is, when we are well. In many kinds of illness, however, the number of white cells greatly increases; perhaps five or even ten times. Doctors used to think that this was one of the bad things about the illness, but now we know better. It happens because the white cells are specially useful in illness, and is one of the ways in which the healing power of Nature shows itself.

These white cells vary a good deal, unlike the red cells, which are all of the same pattern. They vary in size, in the way they stain with various colouring matters, and so on. Probably all these different kinds represent different stages in the history of their lives. They have no elastic coat, but can and do change their shape readily.

For many years it was a great puzzle to find out any use for these white cells. Then many curious things began to be noticed. White cells were seen with microbes inside them, and at first it was thought that the microbes had invaded the cell and were killing it; but then white cells were found with little specks of coal-dust in them, which the cells must have picked up for themselves. Then we learned how to keep a drop of blood warm under the microscope, so that we could watch the white cells even for hours at a time, and it was found that those which had microbes in them did not die, but after a time the microbes disappeared, and the white cells went on living.

Then we found that we could actually see the white cells picking up microbes or specks of any foreign matter in the blood, and dealing with them just as the amœba deals with anything that it is feeding on. Nor was this all. By studying the blood-vessels of a living tissue under the microscope, we discovered that the white cells have a way of passing through the walls of the blood-vessels, and wandering about in the tissues of the body generally. This is now usually called their emigration.

Now, suppose there has been a little damage done to your finger; perhaps some dirt and some microbes have got into the wound. We find that

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the white cells of the blood make their way through the blood-vessels in the neighbourhood of the damage, not in ones, but in thousands. They can be watched doing so, and we find that it may take perhaps as long as half an hour for a single cell to make its way through. There they gather round the place of damage.

THE LITTLE WHITE SOLDIERS THAT DIE TO SAVE YOUR LIFE

Meanwhile, if it is at all a serious damage, in some wonderful way the whole body seems to be told of the fact, and the various organs which make these white blood-cells are urged into unusual activity. If, now, we count the white cells in a drop of blood anywhere, taken from any part, we may find them greatly increased. The cells which emigrate from the place where the damage is attack the microbes, and in nearly every case are victorious, killing them and eating them up.

It is by this means that we recover from such a damage. If you have ever had a poisoned finger, it was the white cells of your blood that enabled you to recover; it was they who killed the attacking microbes which had got into your finger. They die in tens of thousands when they do this, and the creamy sort of stuff which we sometimes call "matter," which the doctor sometimes has to let out of a poisoned finger, is largely made up of the dead bodies of these little soldiers which have died to save the body they belong to.

ONE OF THE MOST WONDERFUL STORIES IN THE WHOLE BOOK OF LIFE

The white cells, then, which were so long a puzzle, now provide us with one of the most wonderful stories that can be read in the whole book of life. They are the defensive army of the body against living enemies from outside, as also against foreign particles that are not alive. They have often been described as the scavengers of the body, or as its police. So far as we can judge at present, during a considerable part of our lives they have very little to do, but they always have to be in readiness, like soldiers or police or the fire-brigade, because at any moment something may happen which needs their attention. It seems quite clear that our recovery from all infectious diseases is due to these little white cells. When we get better from inflammation of the lungs, or scarlet fever, or measles, whooping-cough, chicken-pox, and so on, it is not the doctor who has made us well, but it is ourselves, acting mainly through our white blood-cells. What the doctor can do and does is simply to put us in the best possible conditions so that we may be able to cure ourselves.

Long ages ago great men wrote and spoke about the healing power of Nature. The Latin phrase for that is worth mentioning, for it has to be learned some time. It is *vis medicatrix naturæ*. *Vis* means power or force, and *medicatrix* means healing. Every day that we study the body in health or in disease, whether the body of man, or the bodies of the lower animals, or the bodies of plants, we learn more and more to respect and understand this healing power of Nature. If we come to think of it, life has always, since it began upon the earth, had enemies to fight against —changes of temperature, blows by the wind and blows of water, accidents of a thousand kinds, the attacks of other kinds of life, things that were poisonous to life, and so on.

THE GREAT WONDER OF THE WAY IN WHICH NATURE HEALS US

Therefore, from the very first, it has been necessary for living creatures to learn how to recover from injury. If every injury were to leave damage that remained, life could not have gone on. Throughout the ages this power of recovery must have been increasing, and perhaps, on the whole, it is greater in man than in any other creature.

We know the existence of disease and death and accident, and we see the evidence of much injury that cannot be repaired around us; but we ought not to forget how much injury, how many accidents, how many risks of poisoning, are made right by this healing power of Nature. When that great phrase was invented, men did not in the least understand how this healing power worked. They had scarcely examined the body at all; they merely saw that living creatures in general had something within them that could often protect and save them.

But now we can point to the white cells of the blood, and can say that here, in visible form, is the healing power of Nature about which our ancestors spoke. We can take a drop of blood from a patient who is recovering from an infectious disease, and can see the white cells eating up the microbes in that drop of blood—can practically see what is happening in his blood at that moment. This is far from being the only means by which the body protects itself, but it is perhaps the most wonderful.

THE WONDERFUL THINGS THAT HAPPEN WHEN YOU HURT YOUR FINGER

Another thing which the story of these white cells teaches us is the wonderful unity of the body. The least little injury—a little dirt or the tearing of a finger-nail—and the whole body seems to know at once. The spleen, which is far away inside the body, tiny little glands lying under the skin of the neck and in the armpit—all these are made aware, so to say, probably by means of chemical messengers sent them from the injured part, and at once they begin to double or treble their activities and produce millions of white cells—all because the tip of a finger is in trouble.

This is one of the great services of the blood, in addition to all the other services it performs. It not only carries oxygen and food, and the soldiers—or should we call them the sailors ?—of the body, but it is a great carrier of messages and messengers. Nothing happens in any part of the body without producing chemical changes, and the compounds which are the results of these changes get into the blood, and are carried by the blood-stream ; then, whenever they come to another part of the body which has some business with them, the appropriate result happens. We may hope that some day nations may be as beautifully and unselfishly ordered as the human body is.

HOW ALCOHOL DESTROYS THE POWER OF THE LITTLE WHITE SOLDIERS

We have lately learned that the white cells are much affected by many things in the course of our lives besides the occurrence of damage or danger. Large numbers of them enter the blood when we digest a meal. We do not yet know why. But we have learned that a great many drugs, many of which were supposed to be useful, paralyse the white cells so that they cannot do their work. This is one of the chief reasons why most doctors are nowadays giving much less medicine than they used to give. They are learning to trust more to the healing power of the body itself, and they will not take the responsibility of giving things which simply interfere with that healing power, and perhaps do nothing else. One of the things which has the most marked action in this respect is alcohol. In the presence of only tiny quantities of this substance, the white cells cease to move, and will take no notice of microbes which, if the alcohol were not present, they would eat up at once. This explains why both men and animals who have been given alcohol do not recover from infectious diseases so often as those who have had no alcohol.

Besides the red cells and the white cells, there are other tiny little bodies in the blood, though we should almost think that there could be no room for them. They are very tiny, round, and transparent, and are called the blood-plates ; they are much more numerous than the white cells, but much less numerous than the red. At present we do not know their use.

THE GASES THAT HELP TO MAKE UP OUR BLOOD

That is all we need say about the solid part of the blood. We still have the liquid part and the gaseous part to study. There is much less to say about the gaseous part, but we shall take that first because it goes with what we have said about the duties of the red cells.

The most important gas in the blood is, of course, oxygen. Of this very little is found in the blood in the veins which is going to the lungs, but much in the blood that is coming from the lungs. Nearly the whole of it occurs, however, not as a gas, in which state it would take up far too much room, but combined with Hb to form HbO_2, as we have seen. A very little oxygen is simply dissolved in the fluid part of the blood.

A good deal of nitrogen is always dissolved in the fluid part of the blood, to which it has gained entry from the air through the lungs. It serves no purpose, and does nothing of any kind. Without compounds of nitrogen in our food we should die, but it is only certain

kinds of humble plants that can take simple nitrogen and combine it. The whole animal world, including ourselves, is dependent for its nitrogen compounds upon them.

When we breathe chloroform or laughing-gas in order to avoid pain, these gases are, of course, to be found in the blood. Also, when we breathe impure air, the various gases occurring in it are to be found in the blood.

THE GAS THAT IS ALWAYS BEING MADE IN OUR BODIES

These, however, are exceptions. There is one other most important gas which is always found in the blood, and corresponds, so to say, with the oxygen about which we have been talking. This gas is carbonic acid, the molecule of which consists of one atom of carbon and two of oxygen, so that we write for it CO_2. This is a constant and continuous product of our bodies, just as it is the product of the burning of a fire.

If a fire does not get rid of its carbonic acid, it will be choked, and the same is true of ourselves. There are thus two great differences, and not one, between the blood that runs to the fingers and the blood that runs back from them. The blood that runs to the fingers is rich in oxygen, as we have seen, but contains scarcely any carbonic acid; the blood that comes back in the veins is poor in oxygen, but rich in carbonic acid, which it is carrying to the lungs, where we get rid of quantities of it every time we breathe out. There is such a quantity of this carbonic acid gas to be carried back from the tissues to the lungs that it could not be packed away in the blood in its gaseous form, and so, just as the oxygen has to be combined with something and packed away in HbO_2, which is really a solid, so the carbonic acid has to be combined with something.

WHY NONE OF US CAN LIVE FOR A MOMENT WITHOUT SALT

It seems, however, that neither the red blood-cells, nor the white, nor the blood-plates, have anything to do with this. It is mainly done by one of the precious salts which are always to be found dissolved in the fluid part of the blood. There is a large number of these salts, all of which are necessary to our lives, and therefore necessary parts of our food. Most, if not all of them, are similarly found in the blood of all creatures that have blood and in the body fluid of those creatures which have no blood. The particular salt which carries the carbonic acid within itself, from the tissues to the lungs—or, at any rate, carries much the greater part of it—is called *sodium carbonate*, and though we may not have heard the name before, yet we have all heard of washing soda, and that is really the same thing.

Now, sodium carbonate itself is a compound of the metal sodium and carbonic acid, but there is another salt which is very nearly the same, only it contains two doses, so to speak, of carbonic acid instead of one in each of its molecules. This salt is called sodium bi-carbonate, *bi* simply meaning two. Now, we also know sodium bi-carbonate quite well, for it is none other than what we call baking soda. Outside the body, when we study these two salts, we can observe that, under certain conditions, the simple carbonate will take up carbonic acid and become bi-carbonate; and in other conditions the bi-carbonate will give up half its carbonic acid, and become the simple carbonate.

HOW THE BODY GETS RID OF THE POISONOUS GAS THAT IT MAKES

These two processes are going on ceaselessly in our blood, and are necessary for our lives; but it seems that they go on much more easily and quickly in our blood than outside, partly because of the warmth of the body, and probably also because of some power the body has of making chemical changes within itself quick and easy, though they may be slow and difficult outside.

And now we can picture what happens when pure blood goes to nourish any part of the body. Dissolved in the fluid part of it is a quantity of sodium carbonate. Now, the part of the body to which it goes is living, which means burning, and has made a lot of carbonic acid which it must get rid of. This passes into the blood and combines with the sodium carbonate which it finds there, so as to form sodium bi-carbonate, and that is carried back in the veins, by which at last it reaches the lungs—it probably gets there even from the feet in about two minutes—and there the sodium bi-carbonate is broken up again and loses the extra dose of carbonic acid which it got from the body, and we breathe that out, and so are rid of it.

This, we see, leaves sodium carbonate again in the blood, ready to go to the tissues again, and take up another dose of carbonic acid just as it did before. And so it goes round and round again, like the hæmoglobin and the oxygen. The greatest difference is really that in the one case something which they want is being taken to the tissues, whilst in the other case something they must be rid of is being taken away from them.

THE REAL MACHINERY THAT WORKS WHEN WE BREATHE

But now we are able to look at these two things as the two balanced halves of one process, and that process is breathing, the first necessity of all life. Everything that we call breathing—moving our chest and taking in air, and so on—is really only the beginning of one half of it—that is to say, getting the oxygen; and the end of the other half of it—that is to say, getting rid of the carbonic acid. The real breathing is what the living cells of the body do themselves, aided by the ever-moving blood, which brings them the oxygen and takes away the carbonic acid.

We know that when a flame burns in a good draught it burns quickly and brightly. Now, what does the draught do? It simply blows oxygen to the fuel, and then blows away the carbonic acid that is produced when it burns. If we come to think of it, that is exactly the same as what happens while the blood moves in our body; and just as a fire burns brightest in a good draught, so our bodies burn best and in the most healthy way when the blood moves quickly through them. Sometimes the blood moves too slowly, and becomes almost stagnant in one part or another of the body. This simply means that that part cannot breathe, and so it falls ill. And if the blood be prevented altogether from going to any part of the body, in a very short time it will die. Perhaps we are beginning to learn how wonderful the blood is.

NO MAN QUITE KNOWS THE BUSINESS OF THE SALT IN OUR BLOOD

Now, there still remains the fluid part of the blood to study, and this is equally necessary for our lives. We have already learned one thing about it—that it contains various salts dissolved in it. They all are necessary, but if we had to call any one of them more important than the others, it would be the sodium carbonate, or bicarbonate, about which we have been speaking. This, however, is not the most abundant of the salts in blood.

Common salt, or sodium chloride, which we all know so well, is the most abundant salt in the blood, and gives blood its salt taste, just as it gives tears their salt taste; the tears, of course, have got their salt from the blood. We are far from understanding yet what the sodium chloride in the blood is really necessary for. Certainly we know some useful things it does, but probably there is a great deal more that we do not yet know. It helps to keep certain parts of the blood and the body fluid, for some of the things necessary to the blood and the body will turn stiff and solid if the salt is taken from them. Also, the common salt in the blood is of great importance in the digestion of food, for as it passes through the walls of the stomach certain wonderful little cells that line the stomach act upon this common salt, or sodium chloride, and produce from it an acid, called *hydrochloric acid*, which they pour into the stomach whenever we take any food, and which is very important in digestion.

HOW THE BLOOD HELPS THE BODY TO GET RID OF WHAT IT DOES NOT WANT

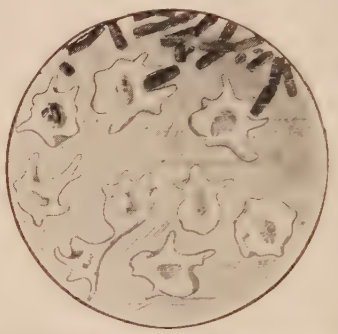
But the sodium chloride of the blood is probably more important than we understand yet. As for the other salts, we scarcely know at all why they should be necessary, though they certainly are.

The rest of the fluid part of the blood is the most astonishing mixture of wonderful things in the whole world. Only quite lately have we begun to learn how wonderful it is. Every speck of food that is to be of any use to us must be carried by the blood; and this alone means that it contains a large number of compounds of very different kinds—various kinds of fat, sugar, and especially the precious food stuffs which we call proteids.

Then, again, all the substances which are produced by the life of the tissues and have to be got rid of are poured into and contained in the fluid part of the blood. We must not imagine that carbonic acid is the only

product of the life of the tissues, though it is the most important one. There are many others, probably amounting to scores, all of which have to be got rid of by the various organs which, besides the lungs, exist for this purpose, especially the kidneys and the skin.

Nor is this all. As we have learned during the present century, the blood also contains, in addition to the white cells, various fluid substances which are poisonous to microbes. This is one of the reasons why we are ever healthy at all—why, though we frequently breathe microbes, though we take millions of them in our food, and though many of them would be injurious to us if they could, we lead what would have long ago been called a "charmed life." These protective substances are partly produced by the white cells of the blood, and are partly given to it by the tissues of the body. They exist in the blood of the lower animals as they do in our own. Then the blood contains a large number of special compounds made by the body itself for its own use. Those parts of the body which produce special chemical substances are called glands. Many glands have little tubes running from them, into which they send what they produce; for instance, the glands that produce the saliva that comes into our mouths when we eat. But several other glands have no tubes of this kind at all. They exist in order to make contributions to the blood for the good of the whole body, and as the blood passes through them it simply takes up these contributions, and carries them where they will be useful. Then there are also, as we know, substances in the blood which simply act as messengers between one part of the body and another, and are carried about by it for that purpose. Perhaps we shall begin to think, then, that a drop of blood is, on the whole, the most wonderful thing in the world. I do not think it would be possible to get anything so complicated in so little space as a drop of blood. But though the blood serves the brain, as it does the rest of the body, and though in a very few seconds the brain stops acting if it does not get fresh blood, the brain is really more wonderful still, and a speck of it containing the nerve-cells is a thousand times further beyond our understanding even than the blood is, for it is those nerve-cells with which we think, and that is the mystery of mysteries.



The first of these pictures shows how blood-vessels look through a microscope. They are filled with blood and its cells, most of them red cells, round and regular, but some of them white cells, large and jelly-like. In the second picture we see some of the soldier-cells—the large white cells of the blood—making a stand against a number of microbes, shown dark. One cell has eaten one or two microbes.

We must now learn about the heart, and the way in which it drives the blood. This great discovery was made by an Englishman, and it is fair to say that all real knowledge of the working of the body dates from that time. This is one of those great discoveries that open the door to whole realms of Nature. Some discoveries are like this: they explain any number of things that could not be explained before. They show the way to still further knowledge, and give us the means of getting there. The discovery of the living cell, the discovery of gravitation, the discovery of the earth's motion round the sun, and the discovery of the circulation of the blood—all these belong to this class of mighty keys to Nature's plan; and when we go on to learn many new things about the body, and about life in general, we have to remember that though we now see further even than William Harvey, about whom we must learn in the next part, it is because we are, as it were, standing on his shoulders.

The next part of this is on page 1579.

WHAT OUR LESSONS TEACH US

THE Reading lesson in these pages teaches us something new, for in it we learn for the first time something about Grammar. Our Writing lesson gives us three new letters which come above and below the lines. If we are learning figures we can turn to the Arithmetic lesson and learn the names of the numbers from 20 to 99. The fairies have more surprises for us in our Music lesson, and for our Drawing this time we are going to draw and paint a spray of leaves. And last, in our Picture-Stories in French, we read how the party arrived in Paris.

CONTINUED FROM PAGE 1215

READING

A FIRST LESSON IN GRAMMAR

NOW we have got on far enough to be able to do a little English Grammar. We shall find that it will help us to learn to read more quickly. And there is no need to be frightened by the word grammar, because grammar is really very interesting.

If you are a BOY, and if you have a sister, you will not call her a BOY, but a GIRL. If you have a schoolmaster, you will call him a clever MAN; but if you are taught by a mistress, you call her a clever WO-MAN. There are many pairs, or couples, of words like this. One is used of people who are males—that is, men and boys—and the other is used of females—that is, women and girls. Here are some of these pairs of words:

BOY	GIRL
MAN	WO-MAN
KING	QUEEN
MAS-TER	MIS-TRESS
LORD	LA-DY

You can go on thinking of plenty more of these if you only try. Ask yourself what relations you have, and you will be able to think of a large number of words like these:

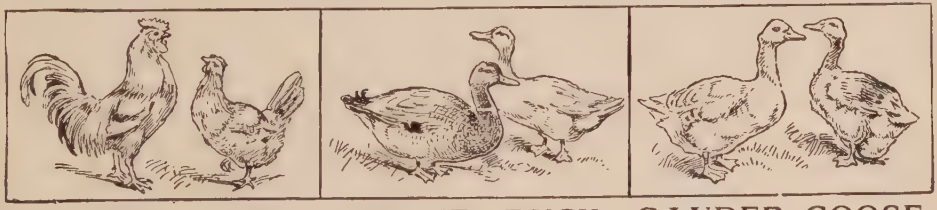
FA-THER	MO-THER
BRO-THER	SIS-TER
UN-CLE	AUNT

Your father calls you his SON if you are a boy, or his DAUGH-TER if you are a girl; and your mother and father can speak of each other as HUS-BAND and WIFE. And when they were being married people spoke of them as BRIDE-GROOM and BRIDE.

Bridegroom and Bride

You will have noticed that the words in the first column always belong to men, or males, and the words in the second column always belong to women, or females.

The same thing is found in speaking of animals. If you go into a farmyard you will see lots of fowls and ducks and geese, and hear them, too, for they do make a noise. When you want to speak of *Mister* Goose, you call him GAN-DER; and if you are anxious to get to know Mrs. Duck's husband, you ask for DRAKE. So we get some more pairs of words to learn:



COCK HEN · DRAKE DUCK · GANDER GOOSE

Don't you remember that in your nursery rhyme you used to say:

"GOOSEY GOOSEY GANDER,
whither will you wander?
Upstairs and downstairs, and in my LADY'S chamber."

All the words that mean males are said to be of masculine gender, and all the words that mean females are feminine. Try to remember these two difficult words.

Now, after all this hard work, here is an easy little rhyme to end up with:

When BABY wants to use her teeth
She bites her FATHER'S LOCK-ET,
And you should see how quick she is
To find it in his POCK-ET.

WRITING

LETTERS ABOVE AND BELOW THE LINES

It took some time for Tom and Nora to write a good l, b, t, h, and k, because they all have loops above the line; but when they were able to write good ones they came to their mother to find out how to make three new letters: d, g, and q.

"D," said their mother, when Tom and Nora had ruled their lines, "will remind you very much of an old friend. This is it:

Directly she had written one d, Nora exclaimed:

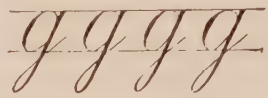
"It is like a grown tall, and it does look easy to make."

"See," said her mother, "I start making d like the first part of a, but when I bring the pencil round to the upper line I do not take it down again at once, as we do in writing a, but carry it right up above the line a little further than the top of the t, but not quite so far as the loops of l, b, h, and k. Then I bring the pen down again more heavily over the up-stroke and end in a pot-hanger, just like t, l, and h. If we remember, as Nora says, that d is a grown tall, a with a top to it, there is really nothing new to learn about it.

Tom was busy thinking about d, and when he started copying the d's his mother had made he whispered to himself, "a, d, a, d."

Now, Nora was learning to spell little words, and she knew that a d spelt ad at the beginning of words, so she said that would also help Tom and herself to remember d was like a with a top added.

Nora and Tom soon learned to write good d's, and then their mother said: "The next letter, g, has something new about it." She then wrote this for them to copy:



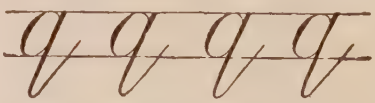
"The first part of it is like a; but the last part—the tail—what is that like?"

Tom and Nora watched their mother as she made the g, and then Tom said the tail had a loop like l, but the loop was down below the line, not above it.

His mother said that was quite right, and that the loops of all letters below the line were just the same lengths as the loops of l, b, h, and k above it. Loops, she told them, must be made the proper length, and the pencil cross over just below the line. Though at first Tom found it by no means easy to make the loops of g all the same length, he found, after a time, that the more carefully he looked at his mother's g before beginning to make one, and saw how long to make the looped tail, the less likely he was to make a bad letter.

"That's the secret of it, Tom," she said. "Look carefully; be sure you are right; then go ahead."

One other letter the brother and sister learned to write that day, and as their mother made it for them to copy they watched her to see if they could find out what it was like.



"It has a tail," said Tom.

"But it is not a loop," exclaimed Nora. "What a funny letter! It seems

in a hurry to end itself, and has no time to make a proper loop like g. What is it called, mother ?"

"It is a q," she replied. "Its tail is just as long as g's ; but you see when my pencil comes to the bottom of the down-stroke of the tail it turns up to the line again on the right. No other letter does that. How can we remember it ? This will help us : q begins queen. It begins the word queer, too, so shall we call it queer q ?"

Nora said that she thought that would help them to remember q.

THE NAMES OF THE NUMBERS FROM 20 TO 99

By this time we can do without always speaking of a bundle of ten pencils. We will call them "tens" only. And the odd pencils in the right-hand box we will call "ones." To go on, then, from nineteen, which is a number made up of a "ten" and nine "ones." When we put one more to this number, we have ten "ones" in the right-hand box, like this :

1	10

But we now have to tie the ten "ones" into a bundle and make a "ten" of them, which we put into the "bundle" box. Then there will be *two* "tens" in the left-hand box and no "ones" at all in the other box, like this :

2	0

The name of this new number, made up of two "tens," is *twenty*. The figures for it, we have just seen, are 20. The names of the numbers after this are easy to remember, up to the time when we again have ten "ones" in the "one" box. We only have to put the one, two, three, and so on, after the twenty, and we get :

twenty-one	21	twenty-six	26
twenty-two	22	twenty-seven	27
twenty-three	23	twenty-eight	28
twenty-four	24	twenty-nine	29
twenty-five	25		

Another "one" put to twenty-nine gives us ten "ones" in the "one" box, which we can tie into a bundle and put into the "bundle" box. Then we have three "tens" and no "ones," so that the figures which stand for the number are 30.

This number, made up of three "tens," is called *thirty*. In just the same way as before, another "one" added to this makes *thirty-one*, and so on.

thirty-one - - - 31
thirty-two - - - 32
thirty-three - - 33
up to thirty-nine - - - 39

After this comes the number made up of four "tens," which is called *forty* (40)

Then we go on again till we come to the next number after forty-nine (49) ; this will have four "tens" in the "ten" box and ten "ones" in the "one" box, which can be made into five "tens" and no "ones"—50. This number is called *fifty*.

We will now write down the names of the other numbers which are made up of an exact number of "tens," with no "ones" left over. The names of the numbers in between are easy.

The number made of six "tens" is called *sixty* (60).

The number made of seven "tens" is called *seventy* (70).

The number made of eight "tens" is is called *eighty* (80).

The number made of nine "tens" is called *ninety* (90).

So that now we ought to know the names of all the numbers from *one* to *ninety-nine*, and the figures which stand for them.

Let us try a few of them.

What number do the figures 57 stand for ? Fifty-seven ; because the right-hand figure means 7 "ones," and the figure to the left of the "ones" stands for "tens," so that we have 5 "tens," and the number made up of 5 "tens" and 7 "ones" is what we call fifty-seven.

What are the figures which stand for eighty-two ?

Eighty-two means 8 "tens" and 2 "ones," and, because we always put the "ones" figure at the right hand, the figures which stand for eighty-two will be 82.

What are the figures which stand for fifty? 50.

Why do we have to write the 0? Because we want the figures to stand for 5 *tens* and *no* "ones," so we must put the 5 for the "tens" and the 0 for the "ones." If we did not put down the 0, but only wrote 5, this would not stand for fifty at all. It would simply mean five "ones," or what we call "five."

Here is an exercise which you can do by yourselves. Say to yourself, or write down, the names of these numbers: 73, 49, 88, 60, 92, 17, 54, 31, 23, 40.

What are the figures which stand for

Twenty-one	Eighty
Forty-seven	Seventy-six
Ninety-eight	Thirty-three
Fifty-five	Sixty-nine
Eighteen	Fifteen

You will have learned all these names before we come to our next lesson.

MUSIC

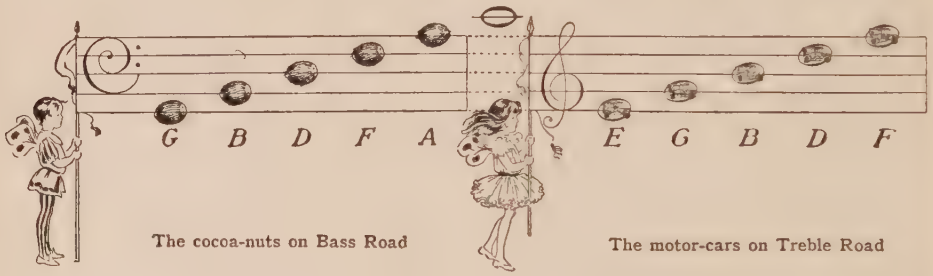
THE FAIRIES IN THE TULIPS

When once we begin to let fairies talk to us, it is quite wonderful how much we learn from them, and how many new things they will show us. We have let them introduce us to the Treble Road and the Bass Road, and already we have seen a fairy procession in wee motor-cars, and a fairy meeting when the fairies arrived on the scene in cocoa-nuts. The motor-cars are still waiting in the Treble Road, and the cocoa-nuts are still to be seen in the Bass Road. But even now there are more fairy wonders in store for us.

One morning Treble Clef was heard telling Bass Clef that her road was prettier than it had ever been, for, curiously enough, in the night beautiful flowers had grown in the spaces between the motor-lines, flowers of different colours, very much like the shape of tulips.

"Indeed, that is strange," answered Bass Clef, "for when I opened my eyes at break of day I looked down my road, and saw shells of varied hue lying between the cocoa-nuts in which the fairies arrived yesterday."

Now, you know, fairies can do all sorts of strange things, and they are very fond of big surprises. We heard the other day that they shut themselves very closely in their little cars to protect themselves against the weather. And so, when the cocoa-nuts arrived on the scene, we heard the fairies' voices, but still we could not see them. Sometimes they can sing to us out of several of their houses at once; sometimes they will leave one of their houses and sing to us from the door of another; but we always have to be very wide awake to understand what is really going on.

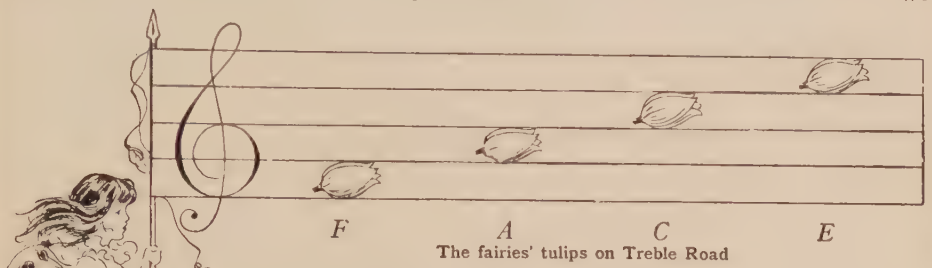
While Treble Clef and Bass Clef were having their little talk, the sun whispered the fairies' new secret to Treble Clef and the wind told all she knew to Bass Clef.

The cocoa-nuts on Bass Road

The motor-cars on Treble Road

The fairies thought Treble Clef had managed their procession so nicely that they would give her a treat, so they decided among themselves that when she woke in the morning she should see beautiful tulips growing in the spaces between the motor-lines, and Fairy F, Fairy A, Fairy C, and Fairy E said they would go and stand inside the tulips, and sing when the right *note* was pressed on the piano.

Do you notice that the little white door is called *a note?* Because the fairies think we are getting to under-

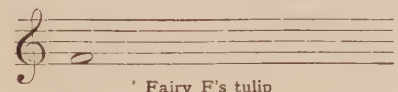
stand them so well that we can begin to speak their language, and they call these little white doors, and the black ones, too, *notes*. We remember that Fairy E's motor-car stopped on the first line, and directly she arrived there we had to go to the piano and press the next white note but one on the right of Fairy C's middle home. Treble Clef now says that if we go to the little white note on the right side of Fairy E



The fairies' tulips on Treble Road

we shall find out about the flower in the first space. Directly we press the note we hear Fairy F's voice.

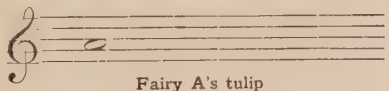
The very first space
I chose for rest,
Henceforth 'tis
known as Fairy
F's nest.


Fairy F's tulip

"What about the second flower?" we ask our friend Treble Clef.

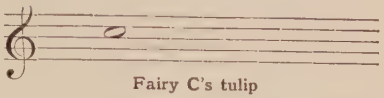
As usual, she sends us to the piano, saying, "You remember which little white note told you about Fairy G's motor on the second line; well, the very next white note on the right of Fairy G is the one to press if you would find out about the flower in the second space." We find the note quite easily, as it lies between the Fairy G and Fairy B. Press it down gently.

"Who's in the second space?" you say,
And a little voice answers, "Fairy A."


Fairy A's tulip

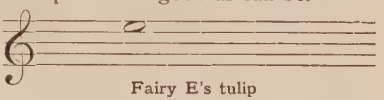
Now we come to the third flower. If we would understand this flower we must go to the white note on the piano which lies between Fairy B's motor on the third line and Fairy D's car on the fourth line. Let us press it down gently and listen.

Rat-a-tat-tat! at space number three;
"Who is at home?" "It is Fairy C."


Fairy C's tulip

Still there is a fourth flower, and again we turn to Treble Clef. She tells us we can find out all about it if we go to the piano and press the little white note lying between Fairy D's motor on the fourth line and Fairy F's motor on line number five. So without more ado we go to that little note.

Space number four for wee Fairy E,
Tulip and I as good as can be.


Fairy E's tulip

All the fairies are so happy that those in the motor-cars and those who are nestling in the petal of a flower join together in another fairy rhyme:

On lines one, two, three, four, and five
E G B D F arrive;
Then F A C E come between,
In the four spaces we have seen;
Here on the treble staff we've spied them,
With little Treble Clef to guide them.

What a beautiful game of play we can have! No less than fourteen little fairies will play with us.

G B D F A are to be found in their cocoa-nuts on the five lines in the Bass Road. We must run to press down each note and see how quickly we can find them. E G B D F enjoy being in their motor-cars on the five lines in the Treble Road.

Now for the little fairies who love their tulips in the four spaces between the five lines in the Treble Road.

F in the first space.
A in the second space.
C in the third space.
E in the fourth space.

PRIMARY READING LESSON

Little cock sparrow,
Sat up in a tree,
And he chirruped and chirruped
So merry was he.
A naughty boy came
With his wee bow and arrow,
Determined to shoot
This little cock sparrow.

Little cock sparrow up in a tree.
I see you, cock sparrow.
I see you, merry little bird.
Chirrup! Chirrup! Chirrup!

See the little boy,
He has a bow and arrow.
What can he do?
What can cock sparrow do?

This little cock sparrow,
Shall make me a stew,
And his giblets shall make me
A little pie, too.
Oh, no, said the sparrow,
I won't make a stew.
So he flapped his wings,
And away he flew.

Oh, no, little boy,
You shall not have me!
You shall not have a stew!
You shall not have a pie!
Naughty little boy.

Oh, little cock sparrow,
See my bow and arrow.
I shall have you, little bird.
I shall have a stew,
I shall have a pie, too.
Come, little cock sparrow!

ACTION SENTENCES

Play you are a little boy.
Play you have a bow and arrow.
Shoot your bow and arrow.
Play you are a little bird.
Play you are in a tree.
Flap your wings.
Fly away, little bird.

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DRAWING & PAINTING A SPRAY OF LEAVES

THIS time we are going to draw and paint a spray of leaves. First, we must find a spray. Any kind of leaves will do, but it is better to begin with the sort that are called evergreens—laurel, ivy, box, or even yew. This is because all leaves and flowers change very quickly, especially after they are picked; and, unless you are clever, they will alter almost before you have time to begin, and this is very confusing when you are trying to copy them carefully.

You remember when we drew the twigs how the stalk was thicker where each little bud grew? Now you will notice that wherever the leaf springs from the stem there is a little swelling; sometimes it is much bigger than at other times.

The stalk of the leaf is not the same thickness all the way down, either. Some kinds of laurel leaves are rounded at the tips and where they join the stalks, and some are pointed. Whichever kind of leaf we have chosen, we must look at all these things and notice the different shapes, because to-day we want to try to draw from memory a single leaf with its stalk before we copy the spray.

When we think we can remember it quite well, we should hide it away somewhere, and then get out our drawing things. Let us number them.

1. The drawing board and pins.

2. The black and the white chalk and brown and white paper.

3. The jar of clean water, the sponge, the paint-box and brushes, and two B pencils—one with a chisel and one with a sharp point.

Now draw the leaf from memory, with its stalk, on brown paper in black chalk, or, if you like, on white paper. Draw several if the first is not a good one; then get your leaves, and see if you have remembered well what one of them was like. See if you have drawn it large enough or too large; if the tip is the right shape; if it joins the stalk properly. Then copy carefully a leaf by itself. You cannot put in the veins nicely with the black chalk, so do not try. It is better to do this with the pencil afterwards, or even to leave them out altogether till you have had more practice. They are so fine and delicate that they must not be made to look as if they were coarse and hard. The veins are just little hollow pipes which carry the sap to feed the leaf, so they want very careful drawing.

Now we will try the spray. Put it on the paper first, and see about how much space it takes up. Put a dot where the tip of each leaf comes on the paper, and where the small stalks and the big stalks

This is how the laurel spray should look when it is drawn from memory in black chalk on brown paper.

If we have chosen ivy leaves to draw instead of laurel leaves, this picture will do to compare our drawing with.

begin and end. If you have not drawn stalks and leaves before, this way will help you, but do not always use the dots; you will not learn to draw so quickly if you do. Put the spray on the left-hand side, and begin with the big stem. Notice if it curves or bends, then draw the leaf-stalks and then the leaves themselves. We shall find it better not to draw the leaves with a single line round them at first, but to rub the chalk sideways on the paper, getting the direction the leaf takes carefully, and drawing it big. The pictures on the last page show laurel and ivy, but any leaves must be drawn in the same way, beginning first with the long stems. We can practise drawing the spray with a brushful of colour in green paint to match the shade of the leaves, or in brown or black paint like the picture above. Moisten the paper with the damp sponge first. If the paper glistens when you hold it level with the eye, it is too wet.

Now we have to make a copy of our laurel leaves, painting them straight away on white paper.

Here is a picture of a spray of ivy leaves painted on white paper. Remember to start with the stalk.

A good, bright green is made by mixing Prussian blue, gamboge, and burnt sienna. A good dark green is made by mixing together indigo and burnt sienna, or Prussian blue and Vandyke brown. We shall find that there are a great many ways of mixing greens when we know our paints.

If we are not tired of our spray by this time, we can try to draw it in pencil on white paper. We must draw the long stem first, just in the same way as we began with the black chalk, but now the leaves must be drawn in *outline*. This is much more difficult. Use the chisel-pointed pencil first, draw lightly on the paper, and do not put your fingers close to the point, but well down the pencil. Use the sharp point to draw all the fine parts—the veins and the thin stalks. Do not try to draw all the little veins, but only the big ones. Remember to make the stalks and the big veins double.

This is a spray of leaves drawn in "outline" in lead pencil on white paper. Use the chisel-pointed pencil, and make the stalks and the biggest of the veins with double lines.

LITTLE PICTURE-STORIES IN FRENCH

IN our story this time, which is continued from page 1215, we read how the party travel from Calais to their hotel in Paris. The first line under each picture is the French, the second gives the English word for the French word above it, and the third line shows how we make up the words into our own language.

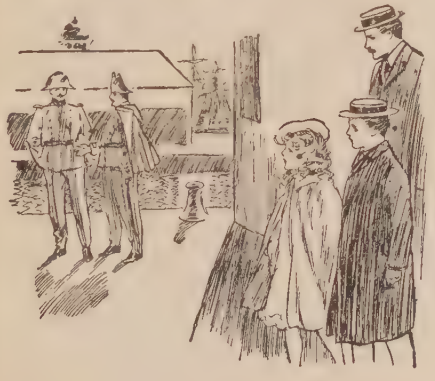
Nous sommes à Calais.
We are at Calais.
We are at Calais.

Le bateau s'arrête.
The boat itself stops.
The boat stops.

Nous courons au côté.
We run to the side.
We run to the side.

Les marins baissent la passerelle.
The sailors lower the gangway.
The sailors let down the gangway.

Nous voulons quitter le bateau.
We wish to quit the boat.
We want to get off the boat.



Bébé dit: "Regardez ces bonshommes!"
Baby says: "Look at those manikins!"
Baby says: "Look at those funny men!"

Ils ressemblent à des poupées.
They resemble to some dolls.
They look like dolls.

Ce sont les gendarmes.
They are the men-at-arms.
They are "gendarmes."

Nous allons à la douane.
We go to the customs house.
We go to the custom house.

Tout le monde cherche ses bagages.
Everybody seeks their baggage.
Everybody looks for their luggage.

Le train nous attend.
The train us awaits.
The train is waiting for us

Il y a le temps de déjeuner.
There is the time of to lunch.
There is time for lunch.

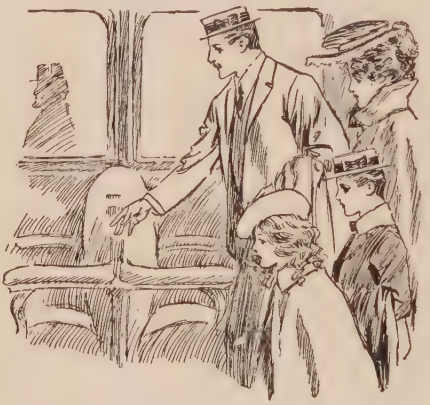
Papa nous dit de rester près de lui.
Papa us tells of to stay near of to him.
Papa tells us to keep by him.

Nous avons du lait et des gâteaux.
We have some milk and some cakes.
We have milk and cakes.

Papa regarde sa montre.
Papa looks at his watch.
Papa looks at his watch.

Il faut se depêcher.
It is necessary to hurry oneself.
We must hurry.

Nous montons pour chercher des places.
We mount for to seek some places.
We get in to look for seats.



Le train est complet.
The train is complete.
The train is full.

Enfin nous nous asseyons.
At last we ourselves seat.
At last we are seated.

Maman est trés fatiguée.
Mamma is very tired.
Mamma is very tired.

Un garçon prête un livre à moi.
A boy lends a book to me.
A boy lends me a book.

Je dis: "Merci bien."
I say: "Thank you well."
I say: "Thank you very much."

Je regarde le livre.
I look at the book.
I look at the book.

Je le montre à Jeannette.
I it show to Jenny.
I show it to Jenny.

Nous sommes dans le train quatre heures.
We are in the train four hours.
We are in the train four hours.

Enfin nous voila arrivés à Paris.
At last we there are arrived at Paris.
At last we are in Paris

Nous allons en voiture à l'hôtel.
We go in cab to the hotel.
We drive to our hotel.

The next School Lessons begin on page 1685

IN THE HEART OF NEW ZEALAND

Here is a picture of a Maori capital. The Maoris or aborigines of New Zealand are a peculiar people, and at one time were very savage, cutting off and pickling the heads of their enemies, and eating their bodies. A Maori warrior's fame depended upon the number of dried heads of his enemies he had in his possession.

New Zealand has many miles of forest lands, which contain valuable trees, such as the cocoanut, the sago palm, the sandalwood and ebony. The timber of this country is of great value for building, and hundreds of thousands of dollars' worth is exported each year. Here we see a saw-mill tucked away at the foot of one of the beautiful New Zealand hills.

Photographs by Brown Bros.

FINDING THE OTHER SIDE OF THE WORLD

On page 854 we read about the wonderful adventures of Captain James Cook. In this picture we see this famous navigator on his little ship, the "Endeavour," sailing round the mountainous shores of New Zealand. It was during his first voyage, which lasted from the year 1768 to 1771, that Captain Cook found New Zealand. He sailed right round New Zealand, being the first man to do so, and brought home to England a description of the wonderful island, which is very similar to the United Kingdom in size and climate. Not content with his discoveries on his first voyage, Cook made two more voyages to this part of the world, and cruised about discovering many of the islands in Oceania. In his last voyage Captain Cook discovered the Sandwich Islands and other groups, but he was unfortunately killed by the natives when trying to land at Hawaii on February 14, 1779.

NEW ZEALAND, THE BEAUTIFUL DOMINION

CONTINUED FROM 1364

WHEN Captain Cook sailed away in his little ship, the "Endeavour," in 1768, by order of George the Third, to make discoveries for England in the Southern Seas, he rounded Cape Horn, and found his way to some islands in the midst of the great Pacific Ocean. They are called the Society Islands now, and belong to France. They are so beautiful that they are often called an earthly paradise. If we could but see with our eyes what those dots in the map of the Pacific stand for!

Islands are always pretty, even in a park lake, or off a broken shore. But in this far-away blue ocean, under the golden sunshine, in the clear, balmy air, it is like fairyland, whichever way we look. If we look down into the crystal water, there are the bright-coloured sea creatures darting about, and splendid shells lying on the dazzling white beaches. Some of the islands are so low that they are scarcely raised above the water; on these grow feathery-topped palm-trees, tall ferns, and brilliant flowers and shrubs, through which one can see peeps of the pale-green water of the lake-harbours hidden inside the ring-shaped island. On the higher, larger islands—none larger than New Jersey—grow sugar-canes, tobacco, fruits, and beautiful trees clothe the hill-sides.

The brown-skinned children of those islands enjoy bathing in the delicious warm sea. They can swim before they can run, and they dive fearlessly through the rolling waves, playing the prettiest water games as nimbly as if they were seals or dolphins. In Captain Cook's time the tribes of people who lived in the various islands were very fierce and warlike; but since his day many missionaries have gone out to teach them to be more gentle, and to give up their old wild ways and their cruel religion.

Delightful as these islands were—and there are so many that Captain Cook found "discovering" quite bewildering work—the little ship "Endeavour" had to go on and find her way to the land named, a hundred years before by the Dutch sailor Tasman, New Zealand.

Many centuries before that a brown-skinned, wavy-haired sailor chief had run his long canoe aground and beheld with delight the white cliffs and trees of the North Island. "Ao-tea-roa!" he exclaimed, meaning the "Long Bright World," as he and his bold seamen leaped ashore. They had been driven from their homes in far distant islands of the Pacific by stress of war, and to this day, though far away, the dwellers in the eastern islands of Polynesia, and the Maori people found

by Europeans settled in New Zealand, still have in common the same old legends and customs, and speak much the same language. Captain Cook spent six months on his survey of the "Long Bright World." He discovered that there are two large islands, parted by the straits now called after him, and a smaller one to the south—the North, South, and Stewart Islands.

WHERE WE SHOULD COME OUT IF WE COULD FALL THROUGH THE EARTH

Altogether the islands are nearly the size of the United Kingdom, and if we can imagine a line driven straight through the earth, it would come out the other side near the islands of New Zealand. If you look on the map you can see the more exact spot marked as Antipodes Islands, where the feet of people walking—if there were any people there—would be just opposite those in England, though 7,000 miles apart.

Captain Cook describes in his journal how handsome and fine-looking were the Maoris; how curiously they tatooed their faces in patterns; how they wear feather cloaks and green stone ornaments. He mentions, too, their warlike disposition, though on the whole he seems to have got on very well with them, and they promised when he went away not to disturb the two posts he had set up to carry the Union Jack.

In the Natural History Museum, New York, are cases full of the works of the Maoris, as the descendants of the bold Polynesian explorers call themselves, and very beautiful and clever are the carvings and polished tools.

HOW WE CAN HAVE TWO SUMMERS IN ONE YEAR BY GOING TO NEW ZEALAND

But the "Endeavour" had once more to go on her way. Leaving Cape Farewell, as they named it, on the north point of the South Island, and sailing away over a thousand miles to the north-west, the explorers arrived at length on the east coast of New Holland, now Australia, where they found a very different race of natives, the Blacks, perhaps the lowest in the scale of human beings.

For some years after this exploration of Captain Cook, the Maoris remained undisturbed, but for the visits of whalers and traders, and adventurers. On Christmas Day, 1814, we find them listening, on a beautiful bay in the North Island, to their first sermon from a Christian missionary—Samuel Marsden. A lovely summer open-air festival is Christmas in New Zealand, with abundance of flowers and sunshine, for the seasons there are exactly opposed to ours in the northern hemisphere, and if we leave Vancouver in the delicious spring days, we arrive twenty-one days later in time for golden autumn in New Zealand. Or if we want two summers in a year, we can leave home after our own, and, going even late in our autumn, can still be in time to enjoy another just beginning this other side of the world.

About thirty years after Marsden came, settlements began in earnest. Soon after Queen Victoria came to the throne, New Zealand was proclaimed part of the British dominions. A great Scotch settlement soon followed, on the east side of the South Island, and round Dunedin—the old name for Edinburgh—most of the names came from Scotland. It is said that the children even now speak with a Scotch accent in this land settled by their grandparents.

THE OLD BATTLEFIELDS HIDDEN UNDER FIELDS OF GOLDEN CORN

An English church settlement was made to the north of Dunedin, in the Canterbury plains, with its capital, Christchurch, and visitors from England say that nowhere in this colony does it seem so homelike and so English as amongst these grassy hills and well-watered valleys.

There were, unhappily, wars lasting many years with the Maoris, chiefly connected with the possession and selling of the land. British gun-boats were seen on the peaceful creek, the sound of the bugle echoed over the valleys, and red coats showed up against the green hills. Battlefields to-day lie hidden under fields of corn, for now all is peacefully arranged, and the brave and skilful Maoris have in fifty years settled down to the civilisation of the strangers. They own land which they farm or let; they have flocks and herds, are educated and hold important positions in the country. They have a most ardent love of their own land, and, indeed, they well may have, for it is one of the most beautiful and fertile in the world.

MOUNTAINS OF SNOW AND RIVERS OF ICE

New Zealand's climate is among the best for invalids, and there are many mountains to climb. Here we see Mount Sefton, in that part of New Zealand called Mackenzie. It crowns with rugged glory a scene of perfect beauty.

If New Zealand has fire and steam in the depths of her soil, she has ice on the summits of her mountains. From the Francis Joseph glacier great volumes of water flow, carrying life and fertility to the plains and valleys below.

This love is shared, too, by the people who have made their homes there, and they are proud to hold together as a nation of New Zealanders.

The climate is partly the reason for this; it is so healthy and enjoyable, with no fogs or depressing damp, but with plenty of wind and sunshine, and so the people are strong and capable of working hard and making the most of Nature's gifts.

AUCKLAND, THE MOST BEAUTIFUL CITY OF THE DOMINION OF NEW ZEALAND

How wonderful these gifts are we can see by passing through the provinces that make up the dominion!

We will start in Auckland, the northern province of the North Island. Its capital, Auckland, the largest and most beautiful city of New Zealand, stands on a narrow isthmus only a few miles across, with a harbour on each side; it is often called the Corinth of the South, after the famous town in Greece. North of this isthmus is a narrow peninsula, the land of the wonderful kauri-tree. One can take train from Auckland to the Wairoa River, and thence by steamer for 120 miles along the greatest inland waterway of New Zealand. The banks of this river are alive with the hum of saw-mills, where great saws slice huge logs into planks with extraordinary rapidity. There is a fall on this river like a small Niagara, and the great tree-trunks come crashing down over the edge. The kauri-trees give a sort of gum, like amber, very valuable for making varnish, and further north still are men prodding the ground with long rods to find the gum that dropped from trees that disappeared long ages ago.

WHERE BOILING FOUNTAINS PLAY AND MEN BOAT ON BOILING LAKES

Many Maoris live in this part of the island, celebrated for its warm, mild climate, fit for growing grapes and oranges and lemons, besides the tropical products grown in the distant islands from which the Maoris came centuries ago. The southern part of Auckland is taken up with the Hot Spring Land. In our land we like spring water because it is so deliciously cold. Here in New Zealand in this wonderful tableland, rising into volcanic mountains, with many lakes between, there are thousands and thousands of boiling springs, all bubbling up from the heated ground and rocks below. Sometimes they burst out with such force that they rise up like a great fountain, over 100 feet high; in other places there are clouds of steam from smaller jets, among which Maori villages are built. The native women need light no fires; the food cooks in the steaming holes; the children bathe in the pools that are only pleasantly warm. Tourists and invalids go to these springs, and many ailments are cured there, and greatly do travellers enjoy the wonderful scenery, and the dancing and singing of the Maori girls.

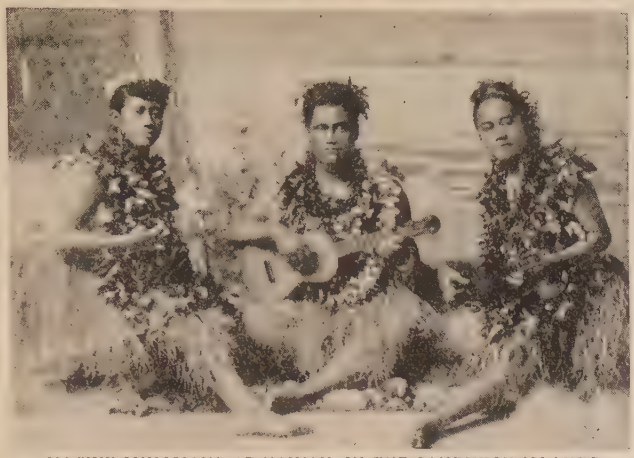
It sounds adventurous to boat on a boiling lake, but this is what many hundreds of travellers do every summer on what is called the most wonderful lake in the world—Rotomahana, which is Maori for "Warm Lake." Near this lake the country was overwhelmed about twenty years ago by immense showers of mud and ash; much of the rocks and earth is coloured by the substances thrown up by the springs, and the rich green of the ferns and mosses and leafy shrubs—like those in the hottest hothouses at home—make a fairyland of beauty, seen through the gauzy steam veil.

THE RICH GLORIES OF RIVER AND FOREST AND NEW ZEALAND'S BUSY CAPITAL

South of the province of Auckland lie the provinces of Taranaki, Hawkes Bay, and Wellington. Taranaki is the native name for the beautiful mountain Egmont, seen by Captain Cook as he passed, and it gives its name to the province. A hundred miles out at sea the sailor can see the beautifully-shaped cone of snow, lifted high above the green trees and small hills at its base! It rises "lofty and lone" from the fertile plain, and is a favourite resort.

What lovely days can be spent on the rivers of this neighbourhood, one of which is a magnificent water-road into the heart of the North Island! Starting from the upper part in the early morning, we pass through groves of the splendid golden blossoms of the New Zealand laburnum, and other lovely flowers. Over high cliffs of rock, made bright with feathery ferns and many-coloured mosses, dash waterfalls, like threads of spun glass. When the river-bed narrows and forms rapids, the canoes

PEOPLE AT THE OTHER SIDE OF THE WORLD



NATIVE MUSICIANS OF HAWAII, IN THE SANDWICH ISLANDS

A MAN OF SOLOMON ISLANDS

A SOLOMON ISLANDER

A YOUNG LADY OF TONGA

A MAORI CHIEF

A NATIVE OF FIJI

A GROUP OF WELL-TO-DO YOUNG LADIES OF TAHITI

These are types of the people who live in the many islands of Oceania, of which New Zealand is the head and centre. Some of them are British citizens. They were all savages, and many of them were cannibals, until missionaries carried the Gospel to them, and educated them in the ways of gentleness, peace, and civilisation.

The photographs on these pages are by Messrs. Underwood & Underwood (London), Mr. N. P. Edwards (Littlehampton), and others.

shoot over them with great and exciting speed. Where the river runs deeply and slowly, the reflections of the cliffs and the rich glories of the forest are like beautiful pictures, about which we can weave fairy stories to our heart's content.

The city of Wellington is the capital of New Zealand, and has its harbour, the busiest harbour in the dominion, on Cook's Strait. It has fine public buildings, in one of which the New Zealand Parliament sits for six months of the year. Women as well as men, Maoris as well as others, have a vote in choosing their members of Parliament; there are four Maori members. It may well be said of New Zealand that the great body of the people control the affairs of the nation. They already have their old age pensions; their railways, telegraph and telephone lines are owned and worked by the State for the improvement and good of the country, not for private profit. In these and many other ways young New Zealand has laws unlike those of England. Many lines of steamers run from Wellington to various ports; a daily steam ferry runs to Lyttelton, the chief port of the South Island, near Christchurch.

AVALANCHES THAT FALL LIKE THUNDER AND MILES OF GLITTERING MOUNTAINS

There are six provinces in South Island—Nelson and Marlborough on the north, Westland and Canterbury in the middle, Otago and Southland on the south. Between Westland and Canterbury runs the beautiful range of the Southern Alps, over 300 miles long, and here one feels in a Switzerland even more beautiful than the one we know and love so well in Europe. The highest mountain, Mount Cook, which the Maoris called "the Light of Heaven," is nearly the height of Mont Blanc. The great ice rivers, or glaciers, are among the most magnificent in the world. From them great avalanches constantly fall with thundering noise, and miles of glittering white peaks against the blue sky contrast in flower-time with the dazzling colours of the beautiful carpet of flowers on the lower mountain slopes.

On the east side of the range lies the great Canterbury plain, one of the richest districts in the country. Here grain stores are found at the stations on the railway line, like the elevators in Manitoba, for great quantities of wheat and oats are grown.

THE SPLENDID FARMS THAT SEND OUT WOOL, MEAT, & GRAIN ACROSS THE SEAS

Besides this, there are splendid farms for dairy produce, and thousands and thousands of sheep flourish, giving great quantities of valuable wool, and providing, since the introduction of cold storage, the Canterbury mutton and lamb, which helps to feed so many of the people on the other side of the world. Christchurch, the capital of this province, is a beautiful garden city of broad streets and open spaces. In Otago are the famous lakes and fjords, and from this province are also sent away large quantities of wool, meat, and grain. Dunedin—a handsome city, with many churches, is the capital of Otago province. Little more than twenty years ago the first cargo of frozen meat was despatched from this colony, and this trade has grown enormously.

In Southland and Stewart Island, called the "last and loneliest," from its position beyond South Island, is also much grand and beautiful scenery. More ice-capped peaks, large glaciers, and great granite precipices, 5,000 feet high, are found at Milford Sound, and there are falls, one of the wonders of the world, nearly 2,000 feet high, like a silver ribbon hanging over the rough mountain wall. Here and there are dark, woody valleys, and deep sea creeks running far inland, with palm-trees and ferns waving over sandy beaches.

WHERE MEN GO DOWN INTO THE EARTH FOR COAL AND GOLD

A great deal of gold is found in New Zealand, both in the Auckland province and in the river-beds of Otago and Westland. The chief coal-mines are on the west of South Island and in the Auckland province. As the years come there are many more valuable minerals to be worked in New Zealand, chief among them being iron. The green stone found on the west coast of South Island was very much prized by the old Maoris, and the curious weapons and ornaments they made of it are still seen in the museums of the large towns.

As in Canada, there is great value in the water-power stored in the rivers and waterfalls of the country; and it is thought that manufactures will increase rapidly in New Zealand, such

HAPPY HOMES IN THE SOUTHERN SEAS

A HOME IN THE ENGLISH ISLAND OF SANTA CRUZ

NATIVE HOUSES IN BISMARCK ISLAND

A HOUSE BUILT ON STILTS IN NEW HEBRIDES

A THATCHED HOUSE IN THE FIJI ISLANDS

A HOUSE IN NEW CALEDONIA

A HOUSE BUILT LOW TO AVOID HURRICANES IN SANTA CRUZ

On a journey around the world we see many strange kinds of dwelling-places. These pictures show us how some of the inhabitants of the islands in the great Polynesian group live. This group helps to make up what we call Oceania in the southern seas. Some of these islands belong to France, some to Germany, and others to Great Britain. Their houses do not need to be so solidly built as ours, for the climate is very hot.

as that of making up woollens, owing to the cheap production of electricity, as happened in America last century through the use of coal in making steam.

Now, since the beginning of this century the limits of the dominion of New Zealand have been carried out to include the Cook and other South Pacific islands. In this "Brighter Britain," so near in size to its Motherland, there are scarcely as many inhabitants as in Glasgow or Liverpool; and the population of the four largest towns put together—Auckland, Wellington, Christchurch, and Dunedin—is very little greater than the population of Washington, D.C.

But we have not yet seen all that goes to make up the possessions of Britain in the southern hemisphere, called Australasia, though Australia and New Zealand are far the most important parts of it.

THE GREAT BARRIER REEF THAT RUNS ALONG THE AUSTRALIAN COAST

When Captain Cook sailed away from Botany Bay, and the lovely flowers that so delighted his naturalist friend, the little ship "Endeavour" made her way safely for over a thousand miles northwards along the coast, known for many years afterwards as New South Wales. Suddenly she struck on a hidden, sharp rock, and made a great hole in her side. It was hastily patched up with sail-cloth and tow, and the voyage was continued to a point now called Cookstown, in Queensland.

This was the manner of the discovery of the Great Barrier Reef, which runs along the east coast of Australia, ten to fifteen miles from the shore, acting as a natural breakwater for the harbours of that coast, and making a still and safe passage for shipping when the breakers of a not very peaceful Pacific dash in clouds of white foam upon the line of jagged rocks, now just below, now just above, the level of the sea.

How little could Captain Cook foresee the never-ending lines of ships laden with wool and gold and food that were to steam northward in the years to come, to pass through the Torres Straits on their way to Great Britain!

North of the Torres Straits lies the large island of New Guinea. It is divided among Germany, Holland, and Great Britain. Great Britain's piece is as large as Great Britain itself. There are many missionaries there teaching and civilising the natives. The climate is very hot, and in it grow best such products as tobacco, rice, sugar, tea, and coffee. There are valuable trees, too, amongst them the cocoanut, the sago palm, sandalwood, and ebony. There are pearl fisheries on the coasts, as on the warm shores of Australia and the Pacific Islands.

THE TWO GREAT CURVES OF ISLANDS RISING FROM THE FLOOR OF THE OCEAN

If we could drain away the water from the ocean as we can from a pond, we should see that the floor of the Pacific, the deepest and largest ocean in the world, rises to the east of Australia in two great curves. New Guinea and Norfolk Island are on the curve nearest the island continent. There is a school in Norfolk Island, to which children from other islands come.

On the outer curve are the Fiji Islands. The native chiefs and people here put themselves under British rule some years ago. Missionaries have taught them, and trade is increasing with Britain, Australia, and New Zealand.

Most tropical plants grow well in Fiji, such as sugar, fruits, and cocoanuts; and still farther beyond lie great groups of islands known as the islands of Polynesia, Melanesia, and Micronesia. These islands, with Australia, New Zealand, and the rest, make up Australasia.

HOW FAR-AWAY ISLANDS ARE LINKED BY CABLES AND STEAMSHIPS

Fifty years ago, the journey to the Fiji Islands was indeed a long and trying one. First it took months to get to Australia, and then weeks in another and smaller ship to the islands. Now all Australasia and Oceania—as the groups of islands are called—is drawn near together and to the rest of the world by electric cables and swift steamships. From the north of Auckland a cable runs to Norfolk Island, Fiji and Fanning Island, to Vancouver and British North America, across the Pacific. There is also a line from New Zealand to Sydney. One travels from Auckland to England in a month, changing ships at Sydney or Fiji, then to Vancouver, and by the Canadian Pacific to the Atlantic. Steamers to London take about six weeks.

The next story of Countries is on page 1545.

HOW THE FAIRY TALES WERE TOLD

IN olden times people were more superstitious than they are to-day, and readier to believe in unnatural and supernatural beings, so that accidents, misfortunes, and "lucky" events were supposed to have been brought about by spirits or by creatures who had the power of making themselves visible or invisible as they chose. Such creatures were the fairies, the brownies, the goblins, and the gnomes. Of course, there was no end to what these fairy-folk could do, and in lonely country places everybody would have some tale about them which he thought to be true. Thus was created what we call folk-lore, or the simple stories told by the countryfolk of all lands. Out of this folklore many fairy tales have come, and no one knows who told them first, as they existed for long centuries before people wrote stories down and signed them with their names. Even famous tellers of fairy tales have often been content merely to relate some of these old stories, and not to invent new ones.

WRITERS OF THE FAIRY BOOKS

CONTINUED FROM 1308

IN that marvellous city which is itself a fairy story, Venice, whose grand old palaces and magnificent churches seem to rise up amid the shallow salt waters by the Adriatic Sea as if at the touch of some great magician's wand, there lived in the early years of the sixteenth century a man named Giovanni Francesco Straparola.

We know very little about this Straparola, except that he was a writer of stories. In those days Venice was the wonder of the world, and all sorts of clever men were drawn to the town because of its riches, and the splendid company to be found there.

Straparola was a clever Italian who had gone there doubtless because it was a famous place for printing books; and there, for many years, in some unknown house by the side of some old canal this man with the strange-sounding name wrote his stories and got them printed in that lovely city of the sea.

All the stories that he wrote cannot be called fairy tales; but as he drew very largely from folklore, most of them are pure fairy stories. It was a later writer who wrote the story of "Puss in Boots," yet Straparola had told the tale before him, though his Puss wore no boots.

Towards the end of the seventeenth century, and in the early years of the eighteenth, "the pleasant land of France" was noted for its writers of fairy tales. It was then that "Blue Beard," "Little Red Riding Hood," "The Sleeping Beauty," "Mother Goose," "Beauty and the Beast," and many another of our old favourites first took the form in which we know them to-day. The two great writers of fairy stories at that time were a Parisian named Charles Perrault, and a French countess, Madame D'Aulnoy. And now we see how grateful we should be for many of our happiest hours to that forgotten Straparola, when we are told that both Perrault and the countess got most of their ideas from his writings.

He must have been a kindly old gentleman, this Monsieur Perrault—who was busy with the affairs of State, being the official in charge of the Royal buildings, and a member of the great French Academy—to have found time and delight in telling his own children these charming stories, and then writing them down for the children of all the world. He was nearly seventy years of age when his principal book of fairy stories appeared, and in dedicating it to one of the young princes of France, he made believe the stories were told by one of his own children, which was only a pretty device for commending

them to other young folk; for Perrault, though a very learned scholar, was not ashamed to set the fashion of writing fairy stories, which now became very popular with the ladies and gentlemen of leisure. The proper title of his book was "Stories or Tales of Past Times," but it had another and better title, "Tales of Mother Goose."

THE GRAND LADY WHO WROTE THE TALE OF CINDERELLA

One of the many grand ladies who lived in France at the same time as Perrault and amused themselves by writing stories was Madame D'Aulnoy. Every time that Christmas comes round and they are playing pantomimes at the theatres, her stories, like those of Perrault, are used throughout our land for this form of entertainment. "The White Cat," "The Yellow Dwarf," "The Fair One with the Golden Locks," "Cinderella," and many another nursery favourite was shaped by her pen from the earliest tales of Straparola. There were many other ladies who, about the time of Madame D'Aulnoy and somewhat later, practised this delightful art of weaving fairy tales, but none of them calls for notice, and as they all borrowed from that little-known writer who plied his pen by the sparkling waters of Venice, a hundred years before them, our thanks for the pleasure of these old tales are perhaps more due to him.

The names of the authors of whom we have been reading may be unknown to all our readers, but we come now to those whose names are familiar to every one of us.

THE BROTHERS GRIMM, WHO WROTE DOWN THE GERMAN FAIRY STORIES

What delight is associated with the otherwise forbidding name of Grimm! "Tom Thumb," "The Queen Bee," "Hansel and Gretel," "The Frog Prince," "Rumpel-stiltskin," and ever so many other stories that boys and girls for nearly a hundred years now have been reading with endless entertainment, were all written down by two brothers named Grimm, who lived in Germany during the first half of last century. Jacob Grimm was the elder of the two brothers, being born at the town of Hanau on January 4, 1785, while his brother Wilhelm was born on February 24, 1786.

These two brothers were probably not in the least like the sort of people one would expect to be fond of telling fairy tales. As a matter of fact, they were sober, industrious scholars whose whole lives were devoted to literary studies and teaching, both of them becoming professors at the university of Berlin. Grave and learned gentlemen they were, whose greatest concern was to produce books of a kind that only students read, and yet they quite unconsciously made themselves famous for ever by collecting the old German fairy stories into a book, which has been translated into all the principal languages of the world, and has made the name of the brothers Grimm as well known in England and America as it was in their native land.

They went out together, these two industrious scholars, among the country-people of Germany, and induced them to tell such stories as they knew of the fairies. What a charming occupation, and how delightful were the results!

HANS CHRISTIAN ANDERSEN, THE LONG AND LANKY COBBLER'S SON

The other name that stands beside the Grimms, in fame is that of Hans Christian Andersen, the great Danish story-teller, who is really a much abler writer than the Grimms. Hans Andersen was certainly one who knew the fairies, as most of his wonderful stories—such as "Little Klaus and Big Klaus," "The Little Mermaid," "The Tinder-Box," "The Wild Swans," "The Ugly Duckling," and "The Snow Queen"—were told to him not by the peasant-folk, but by the fairies of his own brain. We might almost say that while Hans Andersen knew the fairies, the Grimms, and the others we have spoken about, only knew the folk who knew the fairies.

A wonderful and a strange man he was, this Hans Christian Andersen. The son of a poor cobbler, he was born in the year 1805 in the ancient city of Odense, in Denmark. The poor cobbler was a learned man in his way, and used to read books at night with his son Hans, who was growing up a long, lanky lad. But neither his father nor mother were sufficiently strict about his attending school, so that, as a boy, his education was very irregular. He was perhaps more sensitive than most children, being of a nervous, highly-strung nature, and his mother found it necessary to arrange at the first school he attended that he should never be

HANS ANDERSEN'S DREAM OF FAIRYLAND

Hans Christian Andersen was the greatest of all the writers of fairy tales. His mind was like a wonderland thronged with fairy folk, and in his stories he has told us what these little people of his dreams could do. Here we see him seated in thoughtful mood, while many of the fairies to whom his pen has introduced us are busy in the air about him. If we read his stories we shall know all these quaint little beings as though they were old friends.

punished. One day when the teacher, forgetting this, gave him a slight tap with the rod, he immediately took up his books and slate and marched off home. His mother then sent him to another school, where, among the scholars, was a tiny girl who told Hans once that her ambition was to be a dairymaid at a large country house.

WHAT HAPPENED WHEN HANS ANDERSEN TOLD HIS FIRST FAIRY TALE

"You shall be a dairymaid at my castle when I am a gentleman," said the boy in jest, and he drew upon his slate a rough picture of what his castle was like. The little fairies of the brain were already at work prompting him to tell strange stories about himself. So he went on to assure the little scholar that he was really of noble birth, but that the fairies had changed him in his cradle. The girl was very matter-of-fact, and she only replied to his fanciful tale by turning to some playmates and exclaiming, "He is mad, like his grandfather." Alas, it was true his grandfather was weak-witted, and this unhappy reception of one of his earliest efforts to tell a fairy story must have filled the sensitive boy with dread.

It would be quite a long story if we were to follow the incidents of Hans Andersen's life, though everything concerning this strange genius would be well worth telling. We can only, however, mention a very few of the facts of his life. His father died when the lad was eleven, and even at that age he had made very poor use of his schooling, dreaming and idling his time away.

HOW HANS ANDERSEN WENT OUT TO MAKE A FORTUNE, AND WHAT HE DID

It was not very long before he had a stepfather, and soon he had to think of making his way in the world by going to Copenhagen, the capital of his country. It was all because of having appeared on the stage of the theatre at Odense in a very tiny part in "Cinderella," and having written a boyish play which he thought good enough for the stage, that long, dreamy Hans, the laughing-stock of all the lads of Odense, set off on the coach with a little bundle packed by his mother and the sum of only nine dollars in his pocket to seek fame and fortune in Copenhagen; but many a sad and hungry day he was to have before he was famous, and even after his name was known throughout Europe he was so poor a man of business, and made so little money from his stories, that he had grown into an old bachelor before he could have afforded to marry. So he never had any children of his own to listen to his fairy tales, which have charmed the children of all the world. Nor did he think so much of these tales himself at first. His ambition was to be a great dramatist or novelist or poet. Some success he had in each of these branches of the literary art, and indeed, for a time, was very famous as a novelist.

His fairy stories were written at first to please his own fancy or to entertain the children of friends in Copenhagen; but, you see, it was fairy stories the world wanted him to write, and although his novels and poems, as well as his plays, are seldom read by anyone now, the world will never let the fairy tales of Hans Christian Andersen, the poor cobbler's son, who died in 1875, be forgotten.

NATHANIEL HAWTHORNE, WHO WROTE "THE WONDER BOOK"

One of the greatest of the world's writers of fairy tales lived and died in one of the pleasantest parts of America, in New England, and he it is who next claims our attention—Nathaniel Hawthorne. He, too, was born in an old-fashioned town and lived among old-fashioned people; for Salem, in the State of Massachusetts, some fifteen miles distant from the great city of Boston, was one of the old homes of the Puritans. It was there that Hawthorne was born in the year 1804. His ancestors for generations had been seafaring folk, and his own father never returned from one of his long and dangerous voyages.

Nathaniel seems to have been an imaginative, sensitive boy, proud of his brave forefathers and his beautiful mother. He entered into all sorts of boyish games, but meeting with an accident while playing ball, was crippled for a time, and during those days he became a great reader. He was very fond of "The Faërie Queene" and "The Pilgrim's Progress." A little later he had another illness, and had to stay so long an invalid that he could only pass his time in book-reading. But his accident and his illness were not

altogether misfortunes if they stored his young mind with so much of what is best in English literature. When he himself came to write down stories of the people he had known and the life of old Salem, the richness of his mind, as the result of his early reading, was seen in the beauty of his literary style.

Nathaniel Hawthorne had written a great many beautiful stories before he began the book which should endear his name to all young people and entitles him to come into our little company of those who knew the fairies. This is called "The Wonder Book," and it is surely one of the most delightful series of fairy stories ever written.

THE STRANGE OLD LEGENDS OF GREECE TOLD OVER AGAIN

The author's own children were just tiny tots when he wrote "The Gorgon's Head," "The Three Golden Apples," "The Dragon's Teeth," and ten other stories that every boy and girl must read. They tell over again with a wonderful freshness, and in a way that is altogether unique, the strange old legends of Greece. As soon as he wrote these stories he read them to his own children, and so keen were they to hear and clever to remember, that they could repeat most of "The Wonder Book" by heart before it was printed.

For grown-up readers Nathaniel Hawthorne wrote one of the greatest novels, which he called "The Scarlet Letter," and it is for this he is chiefly famous. He was for some years the American Consul at Liverpool, and he died at the town of Plymouth, in New Hampshire, in the year 1864.

THE STORY-TELLERS OF IRELAND, A REAL HOME OF FAIRIES

Ireland is a real home of fairies, the Irish people having had in the old days far more stories of "the wee folk," as the fairies are often called, than the English. So it is surprising that there are not many Irish story-tellers to mention in the present company. Perhaps Thomas Crofton Croker, who was born in 1798, and died in 1854, is the most notable of those who, like the brothers Grimm, collected and recorded the folklore of his country. He wrote a fascinating book called "The Fairy Legends and Traditions of the South of Ireland," which we know that that great and famous writer of romance, Sir Walter Scott, took great delight in reading.

But more interesting than Croker and a closer friend of the fairies—for they must have come to her, as she could not go to them—was a blind Irish lady named Frances Browne, who wrote "Granny's Wonderful Chair." The fairy stories told from Granny's wonderful chair are full of delicious fancy and bright with pictures of Nature. Yet it would not be too much to say that there is nothing so wonderful about them as the fact that their gay and lively scenes could have been described by a poor woman whose eyes had never looked upon the beauties of Nature. Frances Browne was blind from infancy, but she must have had that "inner vision" which enables its possessor to see into the mysteries of life with the eyes of the soul.

A wonderful figure in every way was this poor Irish woman, and since she had not the use of her eyes, she developed the use of other faculties. For example, while her brothers and sisters were saying their lessons aloud for the next day at school, she would learn their lessons by heart, and to induce them to read to her, she began inventing stories from her own imagination.

THE BLIND IRISH LADY WHO WROTE "GRANNY'S WONDERFUL CHAIR"

When only seven years of age Frances Browne had composed a poem, but at fifteen she was so impressed with the wonderful music of Homer's "Iliad," when that was read to her, that she had her own poor childish efforts destroyed, and did not again attempt to compose poems until she was twenty-four. From that age onwards, she composed much charming verse and many stories, removing from her Irish home to Edinburgh, where she became a busy contributor to the magazines.

"Granny's Wonderful Chair" she wrote in 1856, after settling in London, and it immediately became the favourite fairy-story book of the day. Her last novel was written in 1887, when she was seventy-one years of age; and the life of Frances Browne, though one of comparative poverty, was rich in the pleasures of the imagination and in the joy her fairy stories have brought, and still bring, to multitudes of readers.

That fine novelist and splendid type of the Christian gentleman, Charles

Kingsley, might be included here, for did he not write "The Water Babies," which he must have had from the fairies? And John Ruskin also, for he wrote "The King of the Golden River," a perfect fairy tale. But we shall have to speak of them among the writers of the great books, and so we pass to one who is surely the greatest of all our modern explorers of fairyland—none other than the creator of "Alice in Wonderland."

THE CLEVER STORY-TELLER WHO FIRST TOOK US ALL TO "WONDERLAND"

On the title-pages of his books we know this most celebrated of modern fairy-story tellers as "Lewis Carroll," but in real life he had a very different and much less attractive name—Charles Lutwidge Dodgson. We will only think of him as Lewis Carroll, however, as it was under that name, just forty years ago, he became the favourite story-teller for boys and girls.

Everybody, of course, has read "Alice in Wonderland," and perhaps his other fairy books as well—"Through the Looking-Glass," "The Hunting of the Snark," and "Sylvie and Bruno." It is quite unnecessary to recall the name of the many strange characters, such as the Mad Hatter, Tweedledum and Tweedledee, the White Rabbit, and all that varied throng with which every boy and girl loses no time in making acquaintance.

But what sort of man was he from whose brain of teeming fancies these strange and delightful creatures came? Should we picture him as a jolly, middle-aged gentleman, leading a life free from care, and happiest with his children round his knees, telling stories?

"LEWIS CARROLL" AND LITTLE ALICE, THE DEAN'S DAUGHTER

Such a picture would be curiously incorrect, for Lewis Carroll was in certain ways as strange a character as some of his own fairy folk. In the first place, he was, of all things in the world, a mathematician, and lectured at Oxford University on that sicence which is the terror of most young scholars. Perhaps it was because he spent so much time over difficult problems in mathematics that he liked to clear and refresh his brain with humorous thoughts and happy fancies, which he turned into the shape of fantastic stories for the amusement of the children of his friends.

Perhaps he was just a little "moody," being sometimes rather a dull companion to grown-ups, and although he was sixty-six years of age at the time of his death, on January 14, 1898, he had never been married. But though he was an "old bachelor" for many years before his death, he was a comparatively young one when he wrote his immortal story of "Alice's Adventures in Wonderland," first published in 1865. It is very interesting to know how he came to write this story. There really was a little girl named Alice, one of many little girls who were delighted when Lewis Carroll came to visit their parents, as they had never any difficulty in getting him to tell a story. The real Alice was a daughter of Dean Liddell, and she herself has told us how the wonderful story was first begun.

HOW LEWIS CARROLL TOLD ALICE A STORY ON THE RIVER BANK

We cannot do better than let the words of the real Alice be heard again. "Most of Mr. Dodgson's stories," she says, "were told to us on river expeditions to Nuneham or Godstow, near Oxford. My eldest sister, now Mrs. Skene, was Prima, I was Secunda, and Tertia was my sister Edith. I believe the beginning of 'Alice' was told one summer afternoon when the sun was so burning that we had landed in the meadows down the river, deserting the boat to take refuge in the only bit of shade to be found, which was under a new-made hayrick. Here from all three came the old petition of 'Tell us a story,' and so began the ever-delightful tale.

"Sometimes, to tease us—and perhaps being really tired—Mr. Dodgson would stop suddenly and say, 'And that's all till next time.' 'Ah, but it is next time!' would be the exclamation from all three, and after some persuasion the story would start afresh. Another day, perhaps, the story would begin in the boat, and Mr. Dodgson, in the middle of telling a thrilling adventure, would pretend to go fast asleep, to our great dismay."

Is not that a pretty story of how the gate was open that leads us into Wonderland? Lewis Carroll himself has told us of that afternoon when little Alice Liddell and her sisters

THE FIRST TELLING OF "ALICE IN WONDERLAND"

"Lewis Carroll" became famous chiefly because he had three little friends, one of whom was named Alice, who were always asking him to "tell a story." One day he began to make up a story of strange happenings in Wonderland, when he had gone for a picnic up the river with his little friends. That story was the beginning of "Alice in Wonderland," and years later, when he wrote it down and published it, it made his name known for ever.

first induced him to begin describing Wonderland, for at the beginning of his book we read of it in these lively verses;

All in the golden afternoon
Full leisurely we glide;
For both our oars, with little skill,
By little arms are plied;
While little hands make vain pretence
Our wanderings to guide.

Ah, cruel Three! In such an hour,
Beneath such dreamy weather,
To beg a tale of breath too weak
To stir the tiniest feather!
Yet what can one poor voice avail
Against three tongues together?

Anon, to sudden silence won,
In fancy they pursue
The dream-child moving through a land
Of wonders wild and new,
In friendly chat with bird or beast,
And half believe it true.

And ever, as the story drained
The wells of fancy dry,
And faintly strove that weary one
To put the subject by,
"The rest next time." "It *is* next time!"
The happy voices cry.

Thus grew the tale of Wonderland;
Thus slowly, one by one,
Its quaint events were hammered out—
And now the tale is done;
And home we steer, a happy crew,
Beneath the setting sun.

How Lewis Carroll found a girl reading "Alice" in the train

We could go on to tell so many stories about this dear friend of the little girls that there would be no space left for all the other people that must come into this book, and, indeed, a large book has been written about his life; but one little story we must find room for. He was travelling in a railway carriage one day with a lady and her little daughter, neither of whom he knew. The girl was reading his famous book, and he, who always pretended that Mr. Dodgson was no relation of Mr. Lewis Carroll, began talking to the little reader about "Alice in Wonderland." At this her mother joined in and said:

"Isn't it sad about poor Mr. Lewis Carroll? He's gone mad, you know."

"Indeed," said the astonished author, "I had never heard that."

"Oh, I assure you, it is quite true; I have it on the best authority!"

A few days later the little girl received a copy of "Through the Looking-glass" inscribed with her name and the words: "From the author, in memory of a pleasant journey."

It was not only to the little girls that Lewis Carroll told his stories. Little boys also were his friends, and one of these was named Greville Macdonald, whom he almost convinced on one occasion that it would be an excellent thing to have a marble head, as he would not need to comb his hair!

George Macdonald, and the men who wrote "Brer Fox" & "Mr. Two-Legs"

The father of this lad was a very famous man, a great preacher, the author of many fine novels, a poet. His name was George Macdonald. He, too, was one who knew the fairies. Though he did not invent such strange and comic characters as Lewis Carroll has imagined for us, yet he wrote many books of fairy tales—"At the Back of the North Wind," "The Princess and the Goblin," and many more. Only four years ago his son Greville, who is now a well-known physician and has long known how impossible it is to have a marble head, prepared a new edition of his father's famous fairy stories. George Macdonald was born in the north of Scotland in 1824 and died in 1905.

There are, of course, many other fairy-story tellers. Joel Chandler Harris, our American writer, who was born in 1848, and died on July 4, 1908, told those wonderful negro tales of "Uncle Remus," in which Brer Fox and Brer Rabbit and the Tar Baby have such wonderful parts to play; and Carl Ewald, a Danish schoolmaster, born in 1856 and died in 1908, who wrote "Mr. Two-Legs," and some seventy other fairy tales. When we have mentioned them, we have noticed most of those who knew the fairies.

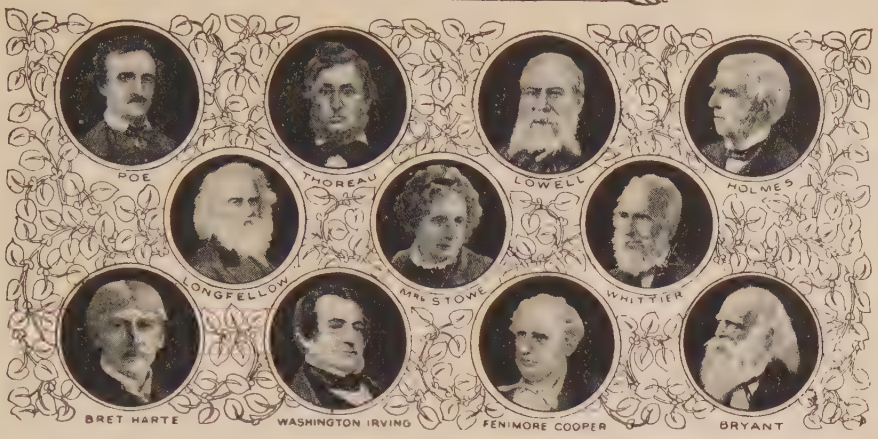
The best of all the fairy plays, "Peter Pan"

Though, after all, we may be asked, "What about 'Peter Pan'?"

Certainly, Mr. J. M. Barrie, the writer of that most charming of all the fairy plays, knows the little folk as well as any we have mentioned; but, of course, he is famous for many other things than the writing of "Peter Pan."

Let us hope the time will never come when great authors may not think it worth their while to tell any more stories of the fairies, for we may be sure there never will be a time when boys and girls will not be ready to listen to them.

The next stories of Men and Women begin on page 1585.



FAMOUS AMERICAN WRITERS

ALTHOUGH the great writers of America—by which, of course, we mean the United States—belong, in a way, to the field of English literature, for Britons and Americans are linked together by the English tongue, there are many reasons why we should consider the great poets and story-tellers of our own land separately from those of England. Descended though most of them were from British colonists, the different conditions of life in America naturally affected the native authors, giving to their writings a character which, if not at first greatly different from that of English literature, has steadily grown more marked, until American literature is now in many ways distinct from that of England.

It is extremely interesting to watch the growth of a literature in the younger countries of the world. At first, in these far lands, where people have to work hard for a living, building log-cabins in clearings of the forests, toiling to make the land fruitful, founding new townships, they have no time to cultivate literature, little even for reading. Then, as they grow richer and more settled, as the little villages blossom into thronging cities, and the people can turn their minds to other things than the mere labour of the day, men begin to write in their leisure; the whole community begins to read what the few are writing. Thus is a native literature born; and it will be found that, though the first writers are likely to imitate familiar models, they will write of things peculiar to their own land, while other writers will arise who will discard all models and endeavour to express themselves in new and striking ways.

So it has happened in this case. American literature is the daughter of English literature, and just because the Americans have been an independent people for over a hundred years, so is their literature a very independent daughter!

Here we are concerned only with the most famous writers whose works have added lustre to the American name, and who, though lacking the genius of the greatest English writers—for America has no Shakespeare, no Milton, no Tennyson, no Scott, no Byron, no Burns—are still worthy to rank with many names that are great in English literature.

We shall not go back so far as the renowned Benjamin Franklin, who, though celebrated as a journalist, as

a statesman, and as a scientist, and one of the fathers of the United States, is not a great figure in American literature. The first writer in whom we are interested was born in the auspicious year of 1783, when Britain recognised the independence of the United States. His name was Washington Irving, and April 3 was his birthday. His father had come from Scotland, his mother claiming Cornish ancestry, and when we know that in his boyhood his favourite reading was found in the poems of Chaucer and Spenser, we can see that he was really a Briton born beyond the sea.

WASHINGTON IRVING, ONE OF THE FIRST WRITERS OF AMERICAN LITERATURE

Irving was in a lawyer's office when, at nineteen, he began writing little humorous articles in a paper edited by his brother. His health showing signs of weakness when he was twenty-one, he came over to England and the Continent for a long holiday, which did him so much good that he lived to be nearly seventy-seven. As a boy, he must have been of a very quiet and gentle nature. "Books of voyages and travels became my passion," he writes, "and, in devouring their contents, I neglected the regular exercises of the school. How wistfully would I wander about the pier-heads in fine weather and watch the parting ships bound to distant climes! With what longing eyes would I gaze after their lessening sails, and waft myself in imagination to the ends of the earth!"

When he returned to New York, he became a lawyer, but, instead of practising law, joined one of his brothers and a friend in starting a journal, which proved so successful that he determined to devote himself to a literary life.

THE AUTHOR OF "THE SKETCH BOOK" AND "RIP VAN WINKLE"

The most important period of his literary work began in 1815, when he paid his second visit to Europe, a visit that lasted for no less than seventeen years. Here he wrote that charming work "The Sketch Book," which contains some of the most beautiful descriptions of historic places ever penned.

His gift of making the description of a place alive with human interest, and awakening in the mind of the reader that tender feeling which comes from the memory of a happy visit to some interesting spot, was quite unrivalled; and now, more than eighty years after "The Sketch Book" was written, it is still widely read in Great Britain, as well as in his native country.

Irving's last great work was the "Life of Washington," our great hero, which he completed only a few months before his own death on November 28, 1859. Washington Irving, after all, was really more English than American in the character of his writings. He excelled equally as a historian, a descriptive writer, and a teller of tales, for his short story of "Rip Van Winkle," which is told again in THE CHILD'S BOOK OF STORIES, was surely one of the world's masterpieces.

The next name to engage our attention is one that young readers of several generations have delighted to greet, and many a grey-head will remember with pleasure. James Fenimore Cooper, who was born at Burlington, New Jersey, on Septemper 15, 1789, was in every way more American than Washington Irving. His ancestors had come from England two hundred years before he was born, so that he was essentially a son of America.

FENIMORE COOPER AND HIS TALES OF REDSKINS AND PIRATES

His father was a judge, and the youth enjoyed many advantages, being well educated at grammar schools and Yale College, before he went to sea in 1806. After two years in the merchant service he joined the United States Navy, and served in it until 1811, when he married and took up the management of the property he inherited.

For nine years he engaged in the pleasant life of a gentleman farmer, and had no notion at all of bidding for fame as an author. But, happening one day to read a story which he thought very poor, he asserted that he could do better himself, and, half in fun, sat down to the writing of his first book. The title of this was "Precaution," and, although it is on the whole a very ordinary story, his friends seemed to like it. So he determined to become an author. This was in 1820. During the next year he published "The Spy," a brisk and racy tale of the Great Revolution, and he found himself popular as a story-teller on both sides of the Atlantic.

THE HOMES OF COOPER AND IRVING

James Fenimore Cooper wrote many interesting tales of the sea and of Indian life. His most famous books are the Leatherstocking Tales, with which most of our boys and girls are acquainted. Here is a picture of his home, Otsego Hall, at Cooperstown, N. Y., where he wrote his novels and where he died.

Washington Irving loved the region around Tarrytown, New York, which he immortalized in the Legend of Sleepy Hollow. His house, Sunnyside, still stands and is an object of interest to all who have felt the charm, through his writings, of the spirit of the author, which we may fancy still clings about the place.

From that day onward he seems to have written a novel almost every year of his life, and his knowledge of the sea and the Indians—Red Indians of his native land—was turned to great advantage in such stirring romances as "The Pilot" and "The Last of the Mohicans." Seven years of his life were spent in Europe. He is described as possessing a "manly figure, high, prominent brow, clear, and fine grey eyes, and royal bearing," which revealed "the man of will and intelligence."

We are told by one who knew him that he was not a "lovable" man, though he was one who commanded respect. It is the lovable men, however, whom we like to remember. But if Cooper, as a man, has not a very warm place in our affections, there can be few readers who do not owe him thanks for many a happy hour spent with his stories of adventure among the Indians, or his salty yarns of the sea. He died at Cooperstown on September 14, 1851.

WILLIAM CULLEN BRYANT, THE FIRST FAMOUS POET OF AMERICA

The poet William Cullen Bryant comes next on America's literary roll of fame. In the course of his life magic changes had taken place in the United States. For though he was born only eleven years after the recognition of American independence, when the towns of "New England"—as his native part of the United States is still known—were quiet little pastoral villages of the old English type, when he died, in 1878, the enormous industrial developments, which has made the United States a land of teeming cities and almost inestimable wealth, were already in full tide.

He was the son of a widely respected physician at Cummington, Massachusetts, and was born on November 3, 1794. His father was a man of refined taste, a lover of books, so the boy had early encouragement to turn his thoughts to literature. But perhaps it was also fortunate that his father was a physician, as we are told that William was of delicate health, and his head seemed much too large for his body. His father, therefore, had him thoroughly dipped every summer morning in a brook that ran near the house, and in the autumn days the ice on the water had sometimes to be broken before the boy could have this bath! It may have been due to this Spartan treatment that, after he reached manhood, he never again was troubled with delicate health.

We have read of many clever children, but surely there have been few who knew all the letters of the alphabet when only sixteen months!

A BOY WHO KNEW THE ALPHABET BEFORE HE WAS TWO

Bryant is credited with this feat of childhood, and when he was ten years old he had already begun to write poetry, which was soon after printed in one of the country papers. The youthful poet read for the law, and, passing in 1815 as an attorney, for the next nine years or so drudged as a lawyer.

Cullen Bryant was just turned thirty, and had been married for some four years, when he gave up his work as a lawyer to devote his life to literature, and in 1825 he settled in New York as editor of the "New York Review." This was a short-lived journal, but his next editorship was that of the "New York Evening Post," and this he retained to the end of his days, filling the position for nearly fifty years.

There is no doubt that, although so much of his energy was expended on daily journalism, Bryant was not only the first of America's notable poets, but one of her writers who is long likely to be remembered. In all his verses there is an intense love of Nature, and, indeed, his feeling for Nature would seem to have been stronger than his human sympathy, the result being to leave his readers a little cold in their affection towards the poet. It is said of him that his wife was his only really intimate friend, and when she died he had no other. But it is pleasant to read of the poet at his country home stopping his gardener from sawing off the branch of a tree when he discovered a bird's nest on it. He had the branch carefully tied up until the little creatures who were born there were able to fly. He died at New York on June 12, 1878.

RALPH WALDO EMERSON, THE FIRST GREAT AMERICAN PHILOSOPHER

The next name to attract us as we turn over the life-stories of America's great men is one of far wider fame than any of those we have been considering. Ralph Waldo Emerson may be described as a master-mind of America, one of the finest flowers of our native

intellect. He, too, was a New Englander, born at Boston on May 25, 1803. He was one of five children left fatherless in 1811 by the death of the Rev. William Emerson, a highly respected minister, whose widow was a woman of character and resource.

Poor Mrs. Emerson did her best to provide for the children, but Ralph and his brother Edward had at times only one overcoat between them, so that their schoolfellows would ask: "Whose turn is it to-day?" The boys had to help in all sorts of household duties, and as they all seem to have been keen to acquire education, they had little time left for play. It was by the help of some friends that they were enabled to enter Harvard College, and even there Ralph waited at table to earn part of his board. There is no evidence that he was a particularly bright scholar, although he was clearly one of the most studious. After leaving Harvard he was a teacher for a time, and then in 1825 began studying for the ministry.

Four years later he became assistant, and, later, minister of the Second Church, Boston; but after three years, in which he had married and lost his first wife, he gave up his church, as his mind was troubled with doubts about the things he was expected to preach. Then he went to Europe, and in England made many friends, becoming particularly intimate with that great thinker, Carlyle—a friendship that endured for forty years.

In 1834 he had returned to America, and married again, settling down in the town of Concord, where he began to write his "Essays" and to deliver the lectures which very soon made him famous as a teacher. Concerning Emerson's teaching, we may read something of interest in the pages of this book.

A STORY OF EMERSON AT THE FUNERAL OF LONGFELLOW

In his old age memory began to fail him, and he would even forget the names of his most familiar friends. One month before his own death, which took place at Concord on April 27, 1882, he attended the funeral of the poet Longfellow, when he remarked: "The gentleman we have just been burying was a sweet and beautiful soul; but I forget his name."

It was in the old town of Salem that Nathaniel Hawthorne, the greatest American novelist, was born, on July 4, 1804. Like Emerson and most of the great figures of American literature, he, too, was a New Englander. It is not necessary to say anything about him here, because we may read his life-story

LONGFELLOW WATCHING THE VILLAGE BLACKSMITH "UNDER A SPREADING CHESTNUT TREE"

The famous poem by Longfellow, beginning "Under a spreading chestnut tree the village smithy stands," appears on page 347.

YOUNG WHITTIER RECEIVING FROM THE POSTMAN THE NEWSPAPER WITH HIS FIRST POEM

on page 1470, in the "Writers of the Fairy Books," and he is only mentioned so that his place in this circle of great Americans may not appear vacant.

A schoolfellow of Hawthorne's was a boy three years his junior, who was to become the greatest of American poets. Henry Wadsworth Longfellow was born at the beautiful seaport town of Portland, Maine, on February 27, 1807, and came of distinguished parentage.

LONGFELLOW, THE MOST POPULAR OF ALL AMERICA'S POETS

His boyhood was full of happiness, due as much, perhaps, to his own gentle nature as to the prosperous circumstances of his parents. He early developed a love for the English poets, and was encouraged to read them, though his favourite reading was Washington Irving's "Sketch Book."

He was so brilliant a scholar that the trustees of his college offered to make him Professor of Foreign Languages if he would go to Europe to qualify for the position. So in 1826 he went to France, and afterwards to Spain, Italy, and Germany, studying the languages of these countries for three years, and then returned to America to take up his work in 1829. He was very successful, and seven years later became Professor of Modern Languages at Harvard University, at Cambridge. Meanwhile, he had been writing much poetry, and translating both foreign prose-writers and poets. But it was not until two years after he had settled at Harvard that his first book of poems, "Voices of the Night," appeared. His second book was a prose romance, "Hyperion," published in the same year; and in 1841 came "Ballads and Other Poems," which included that famous poem, "The Wreck of the Hesperus," which we may read on page 97.

In 1843 the poet married a second time, the lady being the heroine of his story, "Hyperion"; and the smooth course of his life continued, though, after a time, even the light duties of his professorship began to tell on his somewhat feeble constitution. In 1861 the great tragedy of his life occurred; his wife was accidentally burnt to death.

The poet was broken-hearted, but bore up manfully, and through the evening of his days, when his hair had become snowy white, he continued to be the patient, gentle soul he had ever been. The character of the man is reflected in

THE HOMES OF TWO AMERICAN POETS

In this little cottage which still stands though somewhat altered in appearance in Fordham on the outskirts of New York City, Edgar Allan Poe wrote some of his best work. Here he watched his child wife die as much from want of proper food and clothing as from the terrible disease which finally claimed her as a victim.

Here is a picture of Longfellow's beautiful home in Cambridge, Mass., where he was a professor of modern languages in Harvard University. This house was built before the Revolution, and when Washington was in command of the American army in Boston, served as his headquarters. Thousands of visitors every year go to see it and the splendid elms in the yard.

his poetry, which is always tender in feeling and melodious. The most famous of his longer poems is "Hiawatha," that strangely beautiful story from the legends of the Indians, and perhaps the best known of his many shorter pieces is "The Village Blacksmith," printed on page 347. Longfellow died at Cambridge, Massachusetts, on March 24, 1882, and two years later a bust in honour of this sweet singer of the English tongue was placed in the Poets Corner of Westminster Abbey.

In the same year as Longfellow, and in the same state, another great American poet, John Greenleaf Whittier, was born, on December 17, 1807. His boyhood was a harder time than that of Longfellow's, as he had to labour on a farm and to work at shoemaking in order to get the money to go for two terms of six months to the Academy of Haverhill, his native place. His parents were poor Quakers, and his father considered the boy's delight in writing verses a profitless pastime.

Whittier the Quaker Poet, the Sweet Singer of Freedom

The lad read the poems of Robert Burns, to whom he was doubtless drawn at the time by the fact that he also was a farm-worker. He was only about nineteen when one day, as he was mending a wall by the roadside in company with his father, the postman gave him a copy of a local paper in which he had the unexpected joy of reading one of his own poems. Quite unknown to him, his elder sister had sent this to the editor, and thus did the poet make his first appearance in print.

Soon afterwards he managed to get employment as a journalist, and for many years edited newspapers in different towns, and took an active part in the early days of the anti-slavery movement. Indeed, he has been called the "Poet Laureate of Abolition"—no unworthy title—as his poems did much to touch the conscience of the American people on the great question of slave employment. There is a feeling of sweetness and purity in all his poetry, a fresh and wholesome flavour that makes one feel it was written by a good man, and as his work is, so his life was. His books of verse were numerous, and consisted chiefly of short collected poems, of which "Maud Müller" and "Barbara Frietchie," which we may read on pages 3271 and 4851, are the best known. His longest poetical work, "Snowbound," was published in 1866. The poet lived for many years after the triumph of the noble cause for which he had fought with his pen, dying at Hampton Falls on September 7, 1892.

Edgar Allan Poe, the Strange Man who Wrote "The Raven"

No two lives could show a greater contrast than those of Whittier and Edgar Allan Poe, who was born on January 19, 1809, at Boston. In the matter of literary genius, there is very little doubt that Poe was a greater man than Whittier or even Longfellow, and, indeed, it is not too much to say that, in the realm of poetry, his is the most individual voice yet raised in America. His character lacked stability, and his short life was one of much sorrow and disaster, for which he was himself partly to blame. His parents were actors, and they were both dead when he was still a boy. He had the misfortune to be adopted by people of some wealth, who spoiled him by giving him too much of his own way, and allowing him too much pocket-money. He was at school in the north of London for some years while the friends who had adopted him were travelling on the Continent. Then, when back in America at college, although a brilliant student, he ran into debt and drank heavily.

Altogether the story of Poe's life is not a profitable one, and it would almost seem that his highly developed powers of imagination had robbed him of some of the more manly qualities which are a worthy recompense to people of duller minds. He led a struggling life as a journalist, and yet contrived to produce many poems and short stories which must always rank as masterpieces of their kind. "The Raven," which is printed on page 4263, is a good example of his strange, weird poetry.

The Death of Poe, and the Life of Oliver Wendell Holmes

Even his literary criticisms, rapidly written for his magazine, have never been surpassed by the most deliberate work of any of his countrymen. Edgar Allan Poe died in Baltimore on October 7, 1849, as the result of taking a drug, and though his life was a sad one, and though he is a man for whom we cannot

feel very much love, we must admire the genius that gave us so many marvellous stories and melodious poems.

We turn again to a wholesome character and a beautiful life in the next New England writer who calls for notice. Oliver Wendell Holmes was born at Cambridge, Massachusetts, on August 29, 1809. The son of a minister, he received an excellent education, first studying for the law and then for medicine, taking his degree as a doctor of medicine at the late age of twenty-seven. Six years earlier his first poem had been published in a Boston paper, and now appeared his first book of collected poems.

OLIVER WENDELL HOLMES AT THE BREAKFAST TABLE
This picture represents the characters in "The Professor at the Breakfast Table." Holmes is the middle man facing us

Literature for him, however, was only to be an avocation, not his means of life, for he built up a good practice as a doctor, and was professor of medicine at Harvard. He was the genial friend of all the famous Americans of his day; he had a bright and sunny nature, which kept his heart sweet throughout his long life, and in all that he wrote there is the light touch of a gay spirit and the sense of reverence as well; for though something of a gossip, he was saved from littleness by the sobriety of mind which he also possessed. Neither his poetry nor his prose fiction gives him high rank, but he will always be remembered and loved for three of the pleasantest books one can read, in which he discourses in the most entertaining and instructive way on all sorts of subjects. These are "The Autocrat at the Breakfast Table," "The Professor at the Breakfast Table," and "The Poet at the Breakfast Table."

The first was written in 1858, and the last in 1872. Dr. Holmes will also be remembered for his many famous friendships, and when he died at Boston on October 8, 1894, it was felt that one of the most charming figures of American literary life had passed into the land of sunny memories.

We come now to the only lady writer of America whose name has a world-wide fame. Mrs. Harriet Beecher Stowe, born at Litchfield, Connecticut, on June 14, 1811, was the sister of a celebrated preacher, Henry Ward Beecher, and she married a minister who was a professor in the same college where Hawthorne and Longfellow had been students. She is described as "a small woman with pretty curling hair, and far-away, dreaming eyes, and a way of becoming occupied in what interested her, until she forgot everything else for the time."

Mrs. Stowe was forty years of age when she contributed to an anti-slavery newspaper in Washington the story

of "Uncle Tom's Cabin." Written out of her burning indignation at the oppression of the negro slaves in America, this story so caught the sympathy of the whole world that when it was finished the writer found herself famous.

MRS. STOWE AND HER FAMOUS STORY OF "UNCLE TOM'S CABIN"

Though lacking many desirable qualities of literature, it is still an intensely moving tale, and it is doubtful if any other story has ever been so widely read. Mrs. Stowe, in later life, travelled much in Europe and wrote many other books, but while some of these are better written than "Uncle Tom's Cabin," the fame of that story has eclipsed everything else from her pen. She died at the age of eighty-four at Hartford, Connecticut, on July 1, 1896.

A strange and not altogether lovable figure now commands our attention for the moment. The man who is so self-centred that he eschews the fellowship of other men, preferring to play the hermit, is seldom a creature to be admired. In saying this we need not be guilty of belittling the place of Henry David Thoreau among the sages of America. He was born at Concord, Massachusetts, on July 12, 1817, and at twenty years of age graduated at Harvard. He was a friend of Emerson, but we can only imagine his human friendships as being about as genial as the relationship of two marble statues!

Thoreau is credited with great skill as a maker of lead pencils—certainly a worthy occupation; but when, at the age of twenty-eight, he built himself a wooden shanty at Walden Pond, in the woods not far from his native village, and there pottered about by himself for fully two years, observing Nature and employing himself on odd jobs, under the impression that he was helping to solve the problems of life, we cannot consider him a particularly manly person.

THOREAU, WHO WROTE ABOUT HIS LONELY LIFE IN THE WOODS

Thoreau wrote a very charming book entitled "Walden," describing his life in the woods, and this, first published in 1854, is still the most popular product of his pen. Later, he showed some genuine spirit in his advocacy of freedom for the slaves, and in his public defence of John Brown, of Kansas. He made other sojourns in lonely woods, where his quiet and brooding spirit was more at home than amidst the hum and bustle of life in the cities. He was friends, at least, with all the birds and squirrels, and with little children he could play with charming freedom, but his profitless love of solitary life is scarcely a thing to admire. The men we should most admire are those with a high courage to face their destiny on the common battlefield of humanity, or those who love their fellow-beings well enough to delight in the society of their kind. Still, Thoreau has many followers and many admirers, and though we may neither like the character of the man nor care for the starveling gospel he has preached, we cannot but admit the interest of his writings and his claim to a place among America's famous authors. He died at his native town on May 6, 1862, so that his study of Nature's ways and his observance of the "simple life" did not bring him length of days.

JAMES RUSSELL LOWELL, POET, SCHOLAR, HUMORIST, AMBASSADOR

Once again it is a New Englander that greets us in America's roll of fame. James Russell Lowell, born at Cambridge, Massachusetts, on February 22, 1819, owed much to the culture of his parents and the comfortable circumstances in which his early life was passed. He, too, was a distinguished student of Harvard. He was already a poet of some promise when he took his degree in law and set out to practise as a lawyer.

It was due to the influence of his sweetheart that Lowell gradually devoted himself to authorship instead of the law, for she also was something of a poet. He succeeded Longfellow as professor of Spanish and French at Harvard in 1855, having previously equipped himself for the post by a stay in Europe to further his studies, and for twenty years he devoted himself to this work and the writing of literary criticism.

He was also editor of important American reviews, and in 1877 his country honoured him by sending him as ambassador to Spain, and afterwards to England. In 1885 he went back to his native town, and there continued his literary labours until his death, on August 12, 1891. Lowell is eminent among Americans as a great scholar; he had a profound knowledge of books,

THOREAU FELLING TIMBER FOR HIS WOODLAND HUT AT WALDEN POND

and wrote about them with rare charm in such works as "Among my Books" and "My Study Windows." He was a poet with real feeling for romance and an original touch of humour, his "Biglow Papers" taking eminent rank in American humorous poetry.

Although Lowell was in his seventy-third year at the time of his death, somehow we do not think of him as a veteran, and are apt to recall the impression of the poet in the prime of his manhood.

WALT WHITMAN, A HERO AMONG MEN AND A SINGER OF STRANGE SONGS

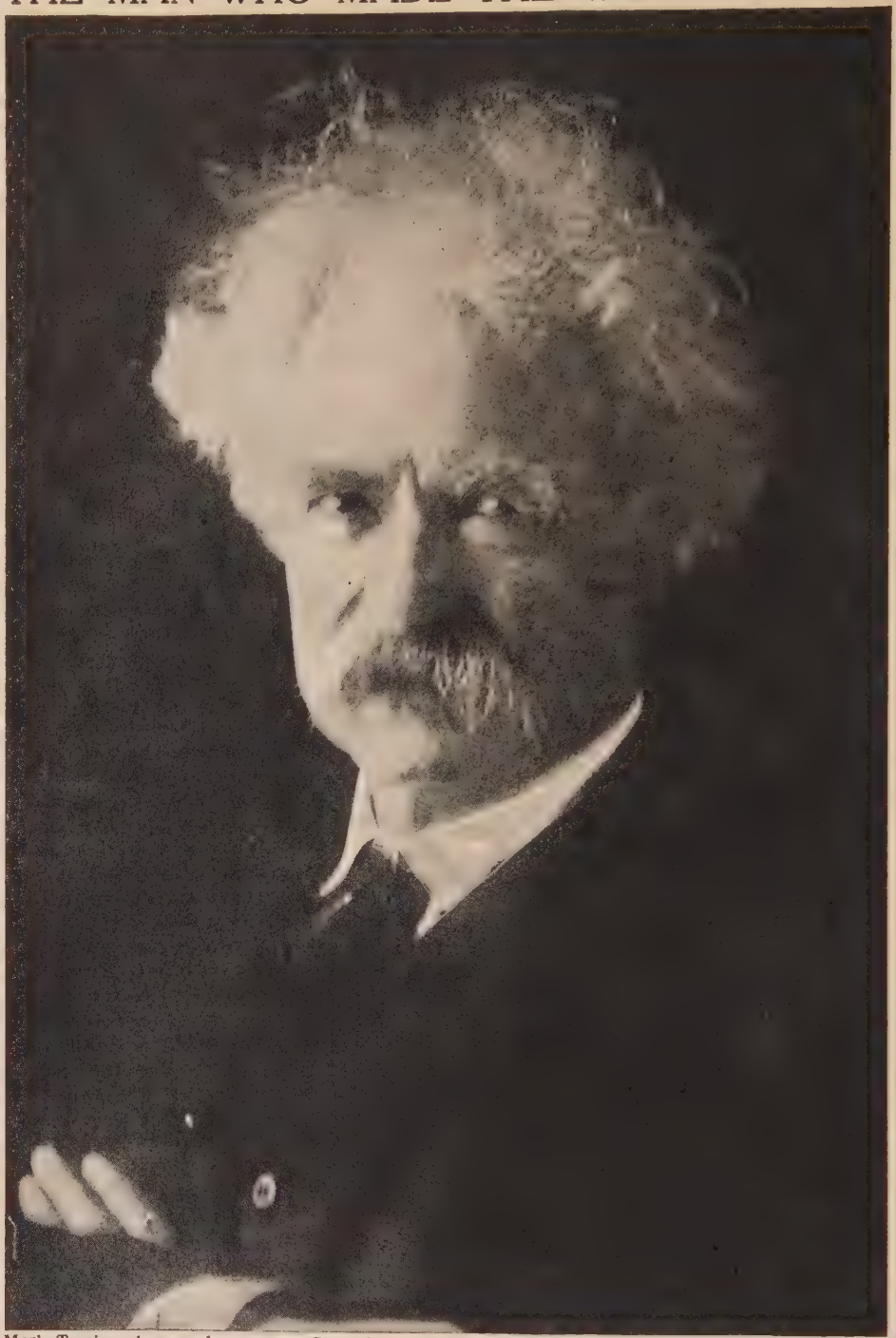
On the other hand, his compatriot, Walt Whitman, is a type of the venerable old man of letters, and was long known as "the good grey poet." Yet Whitman was only a few months older than Lowell when he died. He was born at Long Island, New York, on May 31, 1819, and died at Camden, New Jersey, on March 27, 1892. Whitman was as unlike Lowell in every respect as any two fellow-countrymen could be. But, then, he was unlike every other poet, both in individuality and in what he wrote; indeed, some boys and girls must be rather surprised to read one of his poems and be told it was meant for poetry. For instance, lines like these are not of the usual kind we read in books of verse:

Oh, to make the most jubilant song!
Full of music—full of manhood, womanhood, infancy!
Full of common employments—full of grain and trees.

Oh, for the voices of animals—Oh, for the swiftness and balance of fishes!
Oh, for the dropping of raindrops in a song!
Oh, for the sunshine and motion of waves in a song!

When Whitman began writing like that, in 1855, there were very few people who considered he was anything of a poet. In poetry we are accustomed to look for carefully chosen words, regular metre, and very often harmonious rhyme. Yet none of these beauties make poetry; they are like the work of the jeweller that turns a piece of rough gold into a pretty ring. The rough gold of poetry is thought, feeling, imagination. All these abound in the strange, uncouth lines of Walt Whitman, and no writer of modern times has better expressed in written words the thoughts and aspirations, the feelings and sympathies, of a freedom-loving, fearless son of Nature. His style is very vigorous. "Leaves of Grass," as he called his first collection of these strange and

THE MAN WHO MADE THE WORLD LAUGH



Mark Twain, whose real name was Samuel Langhorne Clemens, was probably America's most widely known literary man. Though he won his greatest fame as a humourist he had wonderful descriptive powers and he could write biting satire as well. No one has succeeded better in showing real boy nature than he has done in Tom Sawyer and Huckleberry Finn. Few men had more friends than he, and in spite of all his fame he remained simple and unaffected to the end of his life.

shapeless songs, full of real poetic power, was the forerunner of many books, and the most characteristic; but it is doubtful if critics will ever agree in their opinion of the writer, beyond admitting that Whitman was at least a great force in modern American thought, that in his individual voice we hear also the voice of America.

WHY WE SHOULD TAKE OFF OUR HATS TO WALT WHITMAN

Whitman's father was a worker with his hands—a carpenter and builder—and Walt, though early in life engaged as a school teacher, was also employed at one time as a printer and again as a carpenter. He wandered much throughout the wide lands of the West, edited newspapers, and made friends with all sorts of humble folk. One winter he drove a stage-coach for a time, in order to keep the place of a driver who was lying ill, and in this we have the real large-hearted man, who sings of his love of comrades in his strange songs. During the Civil War he volunteered as an army-nurse, and for some years he laboured like the giant he was, tending the sick and wounded, all of whom loved the great, gentle fellow that could minister to them with all the tenderness of a woman.

Abraham Lincoln said of him: "He looks like a man!" He was indeed a man, but even his splendid frame could not stand the strain put on it during the war, and when, in 1873, he became partly paralysed, that was the penalty he paid for his services to his follow-men. In his later years, however, he enjoyed many serene days, and was not without honour even in his own country. Whatever we may think of him as a poet, we must take off our hats to the man, Walt Whitman.

BRET HARTE, WHO SOUGHT GOLD AND GAVE THE WORLD SOMETHING BETTER

The last of the great American writers with whom we are here concerned died not very long ago in England, where he had lived for many years. Francis Bret Harte had a varied and picturesque career, and many of his own experiences of the rough life in the pioneer days of California were used by him in his inimitable short stories and poems. He was born at Albany, New York, on August 25, 1839, his father being an eminent scholar, so that Francis started out with a distinct bent towards the delights of reading and writing. He was only eleven when his first poem was printed in a New York newspaper, but this was only made fun of at home. His father died when Francis was still a youth, and at the age of seventeen he set out to seek his fortune in the goldfields of California. Like many another, he did not find gold for the seeking. He tried many occupations, and was also a soldier for a time, rising to the rank of colonel during the Civil War.

It was while engaged as a type-setter on a San Francisco newspaper in 1857 that Bret Harte began to write short sketches, some of which he himself set up in type. Nine years later he was the editor of a new magazine in San Francisco, and in it he published his famous story, "The Luck of Roaring Camp," which is certainly one of the finest short stories ever written. That and "The Heathen Chinee," a delightfully humorous poem, proved sufficient to make his name famous, and for the rest of his life he maintained a great reputation as a writer of tales. Bret Harte came to Glasgow as American Consul in 1880, and in 1885 settled in London, engaging solely in literary work until his death at Aldershot, on May 6, 1902.

HOW "MARK TWAIN," THE HUMORIST, GOT HIS NAME

Of our great American writers, the world-famous humorist, Mark Twain, author of the celebrated "Jumping Frog," "Innocents Abroad," and other entertaining fiction, is the contemporary of most of the poets and story-tellers whose lives we have been discussing, for he was born on November 30, 1835, and had a life resembling in some ways that of Bret Harte. His proper name was Samuel Langhorne Clemens.

The name which he has made familiar all the world over he adopted from the call of the Mississippi boatman who takes the sounding of the river to let the captain know the depth of water, and calls out, "Mark twain," meaning, "by the mark, two fathoms," when the line indicates that depth of water. Mr. Clemens was himself a Mississippi pilot, and among the many books he has written is one describing his life on that great river of the New World.

This is a view of an old Dutch part of the City of New York which Washington Irving so loved. Canal Street, which you see here, was really a canal into which the small ships could go, though it was long ago covered over. Notice the queer Dutch houses, a few of which still remain in the city.

This is a modern picture of gold miners at work, but the miners are doing the same things which those described by Bret Harte did. This surface mining is called placer mining, and requires no capital and no great skill. In the days of which Bret Harte tells, thousands of men in California were doing these very things

THE GRANDMOTHER'S TALE

PIERRE JEAN DE BÉRANGER was the greatest song-writer of France. He was born in 1780 and died in 1857, so that he lived through the most exciting periods of French history. He had a very eventful life, but nothing prevented him from writing his charming songs, full of wit and pathos. Béranger is often compared to the Scottish poet Burns. He was a great admirer of Napoleon, whose praises he sounds in this beautiful poem, which many of us will think worthy of a nobler theme.

CONTINUED FROM 1408

His fame shall never pass away!
Beside the cottage hearth the hind
No other theme shall list to find
For many and many a distant day.
When winter nights their gloom begin,
And winter embers ruddy glow,
Round some old gossip closing in,
They'll beg a tale of long ago—
"For all," they'll say, "he wrought us ill,
His glorious name shall ne'er grow dim,
The people love, yes, love him still,
So, grandmother, a tale of him,
A tale of him!"

"One day past here I saw him ride,
A caravan of kings behind;
The time I well can call to mind,
I hadn't then been long a bride.
I gazed out from the open door,
Slowly his charger came this way;
A little hat, I think; he wore,
Yes, and his riding coat was grey.
I shook all over as quite near,
Close to this very door he drew—
'Good-day,' he cried, 'good-day, my dear!'"
"What, grandmother, he spoke to you,
He spoke to you?"

"The following year I chanced to be
In Paris; every street was gay,
He'd gone to Nôtre Dame to pray,
And passed again quite close to me!
The sun shone out in all its pride,
With triumph every bosom swelled;
'Ah, what a glorious scene!' they cried,
'Never has France the like beheld!'
A smile his features seemed to wear,
As on the crowds his glance he threw,
For he'd an heir, at last, an heir!"—
"Ah, grandmother, what times for you,
What times for you!"

"Then came for France that dreadful day
When foes swept over all the land;
Undaunted he alone made stand,
As tho' to keep the world at bay!
One winter's night, as this might be,
I heard a knocking at the door;
I opened it; great heavens! 'twas he!
A couple in his wake—no more;
Then sinking down upon a seat—
Ay, 'twas upon this very chair,
He gasped: 'Defeat! Ah, God, defeat!'"
"What, grandmother, he sat down there,
He sat down there?"

"He called for food; I quickly brought
The best I happened to have by;
Then when his dripping clothes were dry,
He seemed to doze awhile, methought.
Seeing me weeping when he woke,
'Courage,' he cried, 'there's still a chance;
I go to Paris, one bold stroke,
And Paris shall deliver France!'
He went; the glass I'd seen him hold,
The glass to which his lips he'd set,
I've treasured since like gold, like gold!"
"What, grandmother, you have it yet,
You have it yet?"

"'Tis there. But all, alas! was o'er;
He, whom the Pope himself had crown'd,
The mighty hero world-renown'd,
Died prisoner on a far-off shore.
For long we none believed the tale,
They said that he would reappear,
Across the seas again would sail,
To fill the universe with fear!
But when we found that he was dead,
When all the shameful truth we knew,
The bitter, bitter tears I shed!"
"Ah, grandmother, God comfort you,
God comfort you!"

THE LAST ROSE OF SUMMER

This little poem is by the sweet Irish singer, Thomas Moore, and is one that is widely known and much loved, and has been put to music.

'Tis the last rose of summer
Left blooming alone ;
All her lovely companions
Are faded and gone ;
No flower of her kindred,
No rose-bud is nigh,
To reflect back her blushes,
Or give sigh for sigh.

I'll not leave thee, thou lone one !
To pine on the stem ;
Since the lovely are sleeping,
Go, sleep thou with them.
Thus kindly I scatter
Thy leaves o'er the bed
Where thy mates of the garden
Lie scentless and dead.

So soon may I follow,
When friendships decay,
And from love's shining circle
The gems drop away.
When true hearts lie withered,
And fond ones are flown,
O ! who would inhabit
This bleak world alone ?

Judge not ; the workings of his brain
And of his heart thou canst not see ;
What looks to thy dull eyes a stain,
In God's pure light may only be
A scar brought from some well won field
Where thou wouldst only faint and yield.

THE COURTIN'

"The Courtin'," by James Russell Lowell, tells of a New England courtship in the language of countryside. and is full of a delicate humour and pathos.

God makes sech nights, all white an' still
Fur'z you can look or listen,
Moonshine an' snow on field an' hill,
All silence an' all glisten.

Zekle crep' up quite unbeknown
An' peeked in thru' the winder,
An' there sot Huldy all alone,
'Ith no one nigh to hender.

A fireplace filled the room's one side
With half of cord o' wood in—
There warn't no stoves (tell comfort died)
To bake ye to a puddin'.

The wa'nut logs shot sparkles out
Towards the pootiest, bless her,
An' leetle flames danced all about
The chiny on the dresser.

Agin the chimbley crook-necks hung,
An' in amongst 'em rusted
The old queen's-arm thet gran'ther Young
Fetched back from Concord busted.

The very room, coz she was in,
Seemed warm from floor to ceilin',
An' she looked full ez rosy agin
Ez the apples she was peelin'.

'Twas kin o' kingdom-come to look
On sech a blessed cretur,
A dogrose blushin' to a brook
Ain't modester nor sweeter.

He was six foot o' man, A1,
Clear grit an' human natur' ;
None couldn't quicker pitch a ton
Nor dror a furrer straighter.

He'd sparked it with full twenty gals,
He'd squired 'em, danced 'em, druv 'em,
Fust this one, an' then thet, by spells—
All is, he couldn't love 'em.

But long 'o' her his veins 'ould run
All crinkly like curled maple,
The side she breshed felt full o' sun
Ez a south slope in Ap'il.

She thought no v'ice hed sech a swing
Ez hisn in the choir ;
My ! when he made Ole Hundred ring,
She *knowed* the Lord was nigher.

An' she'd blush scarlit, right in prayer,
When her new meetin'-bonnet
Felt somehow thru' its crown a pair
O' blue eyes sot upon it.

Thet night, I tell ye, she looked *some*.
She seemed to 've gut a new soul,
For she felt sartin-sure he'd come,
Down to her very shoe-sole.

She heered a foot, an' knowed it tu,
A 'raspin' on the scraper—
All ways to once her feelin's flew
Like sparks in burnt-up paper.

He kin' o' l'itered on the mat,
Some doubtfle o' the sekle,
His heart kep' goin' pity-pat,
But hern went pity Zeckle.

An' yit she gin her cheer a jerk
Ez though she wished him furder,
An' on her apples kep' to work,
Pa-rin' away like murder.

"You want to see my pa, I s'pose ?"
"Wal—no—I come dasignin' "—
"To see my ma ? She's sprinklin' clo'es
Agin to-morrer's i'nin'."

To say why gals acts so or so,
Or don't, 'ould be presumin' ;
Mebby to mean *yes* an' say *no*
Comes nateral to women.

He stood a spell on one foot fust,
Then stood a spell on t'other,
An' on which one he felt the wust
He couldn't ha' told ye nuther.

Says he, "I'd better call agin"
Says she, "Think likely, mister."
Thet last word pricked him like a pin,
An'—wal, he up an' kist her.

When ma bimeby upon 'em slips,
Huldy sot pale ez ashes,
All kin' o' smily roun' the lips
An' teary roun' the lashes.

For she was jes' the quiet kind
Whose naturs never vary,
Like streams that keep a summer mind
Snowhid in Jenooary

The blood clost roun' her heart felt glued
Too tight for all expressin',
Tell mother see how matters stood,
An' gin 'em both her blessin'.

Then her red come back like the tide
Down to the Bay o' Fundy,
An' all I know is they was cried
In meetin' come nex' Sunday.

LITTLE SOPHY BY THE SEASIDE.

Charles Tennyson Turner, who wrote this charming sonnet, or poem of fourteen lines, was the elder brother of the great Lord Tennyson, and took the name of Turner when he inherited the fortune of a relative. He wrote many sonnets.

YOUNG Sophy leads a life without alloy
Of pain; she dances in the stormy air;
While her pink sash and length of golden hair
With answering motion time her step of joy.
Now turns she through that seaward gate of heaven,
That opens on the sward above the cliff,—
Glancing a moment at each barque and skiff,
Along the roughening waters homeward driven.
Shoreward she hies, her wooden spade in hand,
Straight down to childhood's ancient field of play,
To claim her right of common in the land
Where little edgeless tools make easy way—
A right no cruel Act shall e'er gainsay,
No greed dispute the freedom of the sand.

THE SUN

In the CHILD'S STORY OF THE EARTH we are told all about the wonders of the big ball on which we live, and how it is daylight in some places while it is dark in others. In the following verses Thomas Miller expresses this fact in simple words that can easily be remembered.

SOMEWHERE it is always light,
For when 'tis morning here,
In some far distant land 'tis night,
And the bright moon shines there.
When you're undressed and going to bed,
They are just rising there,
And morning on the hills doth spread
When it is evening here.
And other distant lands there be,
Where it is always night;
For weeks and weeks they never see
The sun, nor have they light.
For it is dark both night and day,
But what's as wondrous quite,
The darkness it doth pass away,
And then for weeks 'tis light.
Yes, while you sleep the sun shines bright,
The sky is blue and clear;
For weeks and weeks there is no night,
But always daylight there.

* BABYLAND

The poems about the imaginary land where the babies live before they come to stay in the homes of ordinary folk are endless in number and fancy. Miss Ella Wheeler Wilcox, our American writer, describes a lovely and bewitching Babyland in this poem. She is true to the old, old story that the stork knows the way to Babyland, and that it alone can bring away the tiny inhabitants of the happy valley to the country cottage or the city mansion.

HAVE you heard of the Valley of Babyland?
The realm where the dear little darlings stay,
Till the kind storks go, as all men know,
And, oh, so tenderly bring them away;
The paths are winding, and past all finding
By all save the storks, who understand
The gates and the highways, and the intricate byways
That lead to Babyland.

All over the Valley of Babyland
Sweet flowers bloom in the soft green moss;
And under the ferns fair, and under the plants there,
Lie little heads like spools of floss.
With a soothing number the river of slumber
Flows o'er a bedway of silver sand;
And angels are keeping watch o'er the sleeping
Babes of Babyland.

The path to the Valley of Babyland
Only the kingly, kind storks know;
If they fly over mountains, or wade through fountains,
No man sees them come or go.
But an angel may be, who guards some baby,
Or a fairy perhaps, with her magic wand,
Brings them straightway to the wonderful gateway
That leads to Babyland.

And there in the Valley of Babyland,
Under the mosses and leaves and ferns,
Like an unfledged starling, they find the darling
For whom the heart of a mother yearns;
And they lift him lightly, and snug him tightly
In feathers soft as a lady's hand;
And off with a rockaway step they walk away
Out of Babyland.

As they go from the Valley of Babyland
Forth into the world of great unrest,
Sometimes in weeping he wakes from sleeping,
Before he reaches the mother's breast.
Ah, how she blesses him, how she caresses him!
Bonniest bird in the bright home band,
That o'er land and water the kind stork brought her
From far-off Babyland.

THERE'S ROOM AT THE TOP

"There's Room at the Top" was written by Mrs. Lilla T. Elder, an American poet. Mrs. Elder, who had children of her own, so thoroughly understood child nature, that her verses cannot fail to be a source of delight to boys and girls of all ages. Several of her most charming poems will be found in different parts of the Child's Book of Poetry.

THE hill of success may be steep, boys,
And hard work it may be to climb,
But the way grows smooth towards the top, boys,
And it's only one step at a time!

Be sure you are honestly shod, boys!
Take the staff of Self-help in your hand,
Watch out for the rough, rocky tread, boys,
And trust not to gravel or sand.

Look not far up into the clouds, boys,
Nor yet on the valley below,
But steadfastly, patiently, climb, boys!
Each step of the way learn to know!

Respect well the right of road, boys,
Let others more swift pass you by,
And fail not to hold out a hand, boys,
To all those who stumble and sigh.

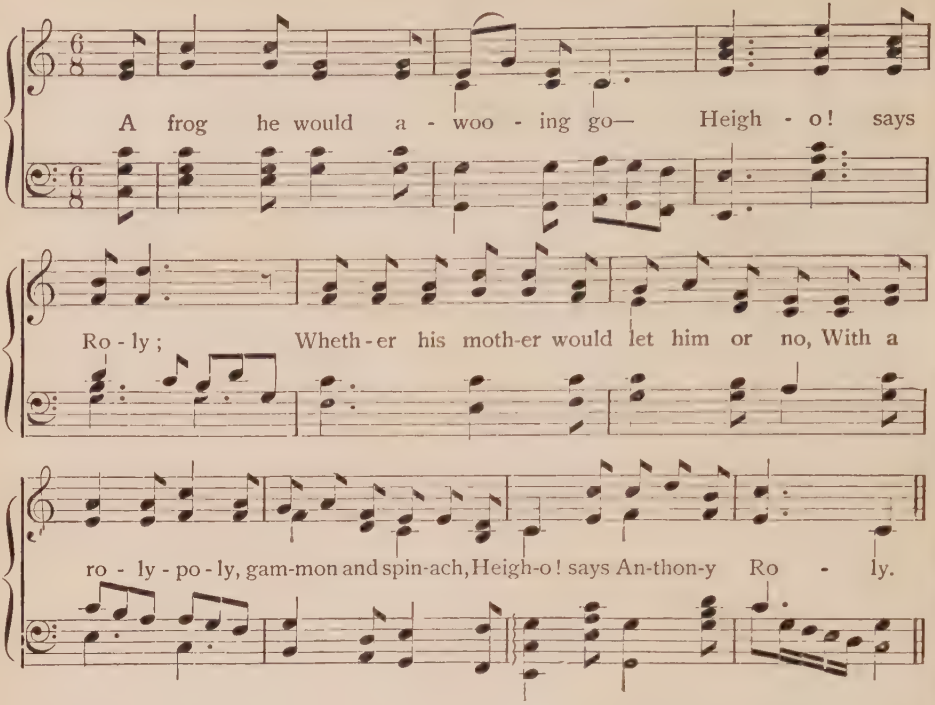
There's plenty of room at the top, boys,
Though crowded the pathway and long,
And no one need fail in the end, boys,
If he's honest and patient and strong.

LIVING for self and thinking of self,
And of nothing on earth beside,
Just as if Jesus had never lived,
And as if He had never died.

ANON.

* From "Poems of Pleasure," copyright, 1902, by Ella Wheeler Wilcox. By special permission of the publishers, W. B. Conkey Company, Hammond, Ind.

A FROG HE WOULD A-WOOING GO


A frog he would a - woo - ing go— Heigh - o! says
Ro - ly; Wheth - er his moth-er would let him or no, With a
ro - ly - po - ly, gam-mon and spin-ach, Heigh-o! says An-thon-y Ro - ly.

So off he set in his coat and hat,
Heigho! says Roly.
And on the way he met a rat,
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

"Please, Mr. Rat, will you go with me?"
Heigho! says Roly.
"Good Mrs. Mousie for to see?"
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

When they came to the door of Mousie's hole,
Heigho! says Roly.
They gave a loud knock, and they gave a loud call,
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

"Please, Mrs. Mouse, are you within?"
Heigho! says Roly.
"Oh, yes, dear sirs, I am sitting to spin,"
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

"Please, Mrs. Mouse, will you give us some beer?"
Heigho! says Roly.
"For Froggie and I are fond of good cheer,"
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

"Please, Mr. Frog, will you give us a song?"
Heigho! says Roly.
"But let it be something that's not very long,"
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

But while they were making a terrible din,
Heigho! says Roly.
The cat and her kittens came tumbling in,
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

The cat she seized Mr. Rat by the crown,
Heigho! says Roly.
The kittens they pulled Mrs. Mousie down,
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

This put Mr. Frog in a terrible fright
Heigho! says Roly.
He took up his hat and he wished them good-night,
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

But as Froggie was crossing over a brook,
Heigho! says Roly.
A lily-white duck came and swallowed him up,
With a roly-poly, gammon and spinach,
Heigho! says Anthony Roly.

THE TALES OF SIR WALTER SCOTT

THERE does not exist in English literature any series of books by one man that can compare in quantity or in quality with the Waverley Novels, written by Sir Walter Scott between the years 1814 and 1831. These wonderful tales of the past would fill no fewer than 10,000 closely-printed pages, and the period of history covered by them is more than 700 years. Clearly, then, it is impossible to re-tell here all the stories in the Waverley Novels. A complete edition usually contains twenty-five volumes, and there are in all thirty-two stories. A number of the novels that can best be re-told in a little space will be dealt with in these pages; but, in addition to that, we must have some general idea of the whole series, and so we may begin by looking at the whole of this wonderful library before we turn to the particular books.

THE WAVERLEY NOVELS

CONTINUED FROM 1315

ALTHOUGH Sir Walter Scott's novels cover a period of more than 700 years of European history, we are not to suppose that he wrote them in the order of time. As a matter of fact, the very first of his stories described the life of only sixty years before his own day. It was called "Waverley: or 'Tis Sixty Years Since," and dealt with the Jacobite rising of 1745. The story that goes furthest back into history was one of the last two he wrote in the year 1831. It is called "Count Robert of Paris," and deals with the First Crusade of the eleventh century, the scene being laid chiefly in and around the wonderful city of Constantinople.

We must always bear in mind when we are thinking about the Waverley Novels that, though most of them are founded upon fact, they do not derive their chief interest from being historical, but from being told with so much spirit and romantic force that we are enthralled by the swift and straightforward movement of the story, and never stop to ask ourselves whether it is all true history or largely the invention of the wizard story-teller.

Perhaps it will be best, though it is certainly unusual, to take our quick glance through the Waverley Novels, not in the order in which the author wrote them, nor yet in the order we ourselves need read them, but in their historical order, as though they were all chapters in one long tale of seven hundred years.

"Count Robert of Paris," as we have already heard, is a tale of the First Crusade, of the year 1098. The story itself, or rather what is called the "plot," is not very remarkable, but the adventures of the count and the other leaders of the Crusade, among whom was the famous Peter the Hermit, are full of healthy excitement, and give us a fine picture of those distant times when men lived only to fight, most of the Crusaders even being more anxious for the fighting than for the avowed object of the Crusade, which was the delivering of the supposed sepulchre of Christ from the hands of the Mohammedans.

The next novel in point of time is "The Betrothed," the scene of which is laid chiefly in Wales about the year 1187. This was the time of the Third Crusade, and, indeed, the novel was written as one of the "Tales of the Crusaders." Its interest, however, centres in Wales, the heroine being Eveline, the daughter of Sir Raymond, a Norman lord. She is "the betrothed," for she undertakes to wait three long years to become the wife of Sir Hugo de Lacy, who has gone away to fight with the Crusaders. But before he can return Eveline is captured by a Welsh prince, who had previously sought to marry her, but had been defeated by Sir Hugo when attacking Sir Raymond's castle. Sir

Hugo's nephew, Sir Damian, rescues her, and is almost killed himself. Eveline nurses him, and they fall in love with each other. When Sir Hugo returns from the Crusade and finds that his nephew loves his own "betrothed," he generously stands aside and allows them to marry.

HEROES AND HEROINES OF "THE TALISMAN" AND "IVANHOE"

"The Talisman," which is one of the finest of Sir Walter's stories, deals with the same period of history and the battles of the Crusaders in Assyria during the year 1191. The great hero of the story is Richard I., or Richard the Lion-Heart, and his noble enemy is the Sultan Saladin. The "talisman" is just a little red purse which Saladin carries in his bosom, and which, when he comes disguised as a physician into the camp of the English king, he uses to cure Richard of a fever. There is, of course, a love story in the book as well, and endless adventures. The heroine, the Lady Edith, a kinswoman of Richard, marries Sir Kenneth, the heir to the Scottish throne, and Saladin presents her with his "talisman."

"Ivanhoe" is a splendid romance of life in England, just three years later than the period of the previous novel. This is one of the books we shall read further on.

Next comes "Castle Dangerous," which is a romance of "The Perilous Castle of Douglas," so called because it was three times taken from the English in the years 1306 and 1307. This story was the last which the great novelist wrote, when he was broken in health and fortune and had not many more months to live.

THE STORIES OF "THE FAIR MAID OF PERTH" AND "THE BLACK MONK"

But "The Fair Maid of Perth" takes us nearly another century onward in history, as the period is 1402, though a descendant of the Douglas has an important part to play in the story. Henry IV. now rules in England, and Robert III. in Scotland. There are two love stories in the book, but the one that interests us most is, of course, that of the "Fair Maid," whose name is Catharine Glover.

On St. Valentine's Day Catharine kisses Henry Smith, the armourer, while he is asleep, and afterwards he proposes to marry her, but she refuses. In the end, however, and after many adventures, when Henry might have a knighthood if he cared to accept it, the "Fair Maid" becomes the wife of the armourer.

These were the days when many Scotsmen went abroad to fight for foreign kings and princes in the wars which were always raging on the Continent. "Quentin Durward," which is one of the best of the novels, is the tale of a young Scotsman of that name who finds his fortune as one of the Scottish guards of Louis XI. of France, and ends by marrying a countess in the year 1468.

Just six years later is the period described in "Anne of Geierstein," in the scenes of which we travel to Switzerland, Germany, and France, and learn much about the secret Tribunal of Westphalia, presided over by the "Black Monk," the father of Anne. Two English gentlemen, the Earl of Oxford and his son, Sir Arthur de Vere, are travelling, disguised as merchants, bearing a letter to the Duke of Burgundy, and it would have gone ill with them had it not happened that Anne had met Sir Arthur and fallen in love with him before. So her father acquitted them, and later on Sir Arthur married Anne.

THREE STORIES OF THE DAYS OF THE GREAT REFORMATION

We are at home in Melrose, on the Tweed, and the neighbourhood which Sir Walter loved so much, in the story of "The Monastery," and the year is 1550. "The Abbot" is also a story of Scotland in the year 1557, and both of these are largely concerned with the Reformation, neither being so interesting as most of the other novels, though Mary Queen of Scots is splendidly described in "The Abbot." "Kenilworth" is a third story of Reformation times, the period being 1575, and it is infinitely more interesting than either of the other two. Nothing could be finer than its animated descriptions of Kenilworth Castle and the fête given there by the Earl of Leicester in honour of Queen Elizabeth, whose character is finely described. Leicester has secretly married Amy, the daughter of Sir Hugh Robsart, but cannot let this be known to the queen. Amy's end is mysterious. The story is full of exciting incidents and characters so well described that we seem to have seen them in real life, and are never likely to forget them.

We arrive at the beginning of the seventeenth century, during the reign of King James I., in "The Fortunes of Nigel," which tells the extraordinary adventures of a young Scottish nobleman who comes to London to get the king to restore his estates, and how he succeeds, after many disappointments, in establishing his "fortunes," while in "A Legend of Montrose" we have passed over forty years, and find ourselves in Scotland during that terrible time when the Civil War was raging in England and the Earl of Montrose was fighting for King Charles in the North against the Covenanters, who were led by the Marquis of Argyll. This story contains one of the novelist's finest characters, in the person of Sir Dugald Dalgetty.

IN THE DAYS OF THE "MERRY MONARCH" AND THE GAY CAVALIERS

King Charles I. is beheaded, and the Commonwealth has been declared by the year 1652, with which "Woodstock" deals. Though not one of Sir Walter's best works, this is a spirited and entertaining romance, which is chiefly concerned with the adventures of Charles II., ending with the death of Cromwell and the king's entry into London. "Peveril of the Peak" carries us some twenty years later and well into the reign of "the merry monarch," the period being 1678. It is a story of Cavalier and Roundhead, the daughter of one who had been a supporter of the Commonwealth, Major Bridgenorth, falling in love with Julian Peveril, a Cavalier. It is a very long story, and contains the enormous number of 108 characters. The hero and heroine marry in the end, of course. "The Peak" is another name for Derbyshire, in which many of the incidents happen.

THE MOST TRAGIC OF ALL SIR WALTER SCOTT'S STORIES

The time of "Old Mortality" is exactly the same as the previous story, but the scene has changed to Scotland and Holland. Of this we shall read at greater length. "The Bride of Lammermoor," perhaps the greatest, and certainly the most tragic, of all the Waverley Novels, comes next in point of time. It tells of the sad fate that befell Lucy Ashton, because she yielded to the pressure of her parents and married Hayston of Bucklaw, while her true lover, the last Lord of Ravenswood, was hastening home to her from the wars in the Netherlansd.

"The Pirate" gives us a truly romantic picture of the wild scenery and the primitive life of the Shetland Islands at the beginning of the eighteenth century; while "The Black Dwarf" is a romance of about the same period, the scene being laid in the Lowlands of Scotland. "The Black Dwarf" is a mysterious person who is consulted by Isabella Vere, the daughter of a Jacobite leader, who would force her to marry his friend, Sir Frederick Langley. The Black Dwarf helps her, for he is really Sir Edward Mauley, and has power over the unscrupulous Sir Frederick. He appears just as the wedding is about to take place, and forbids it. Isabella later marries her own true love, the young squire Earnscliff.

STIRRING STORIES OF THE WILD SCOTTISH HIGHLANDS

"Rob Roy," that splendid story of a Highland chief, brings us to the year 1715, and, of course, we must read of it further on as well as of "The Heart of Midlothian" and "Waverley," both of which also refer to the first half of the eighteenth century. Next comes "Redgauntlet," the story of a conspiracy formed by Sir Edward Hugh Redgauntlet in the year 1763 on behalf of the Young Pretender. "Guy Mannering," which introduces us to many memorable characters, though the hero himself is not one of these, brings us to the second half of the eighteenth century, with which period the story of "The Surgeon's Daughter" is also concerned. This describes the remarkable adventures of Menie Gray in India, and her return to her native country.

We are just at the closing years of the eighteenth century in the stirring romance of "The Antiquary," which we shall deal with at greater length, and last of all there is "St. Ronan's Well," which brings us into the earlier years of the nineteenth century. This is not a very successful work compared with some of the other fine stories among the long list of the Waverley Novels.

THE STORY OF A HIGHLAND REBELLION

BEING THE ROMANCE OF "WAVERLEY"

THE Second Jacobite Rebellion was almost confined to the Scottish Highlands, and broke out on the landing on Scottish soil of Charles Edward Stuart, grandson of James II. of England, called by his adherents "the Young Chevalier," and also "Bonnie Prince Charlie," and by the other party "the Young Pretender." It was the object of the rising to place this young man on the English throne, which was then occupied by George II.

THE YOUNG DAYS OF THE HERO, EDWARD WAVERLEY

Edward Waverley, the hero of Scott's first novel, was the son of Richard Waverley, an ambitious politician who looked to the Whigs, the supporters of the king, for political advancement, and nephew of Sir Everard Waverley, of Waverley-Honour, a wealthy bachelor who regarded Edward as his heir.

Sir Everard had no particular love for the House of Hanover, to which King George belonged, so that as Edward lived partly with his father, and partly with his uncle—his mother being dead—he came in his early years under the influences of the two great opposing political forces of the time.

Sir Everard and his sister, Mistress Rachel, became somewhat alarmed at their nephew's habits of desultory reading and love of solitude, which his father did nothing to counteract. Mistress Rachel suggested that the boy should travel on the Continent with his tutor.

YOUNG CAPTAIN WAVERLEY'S FATEFUL MISSION TO THE HIGHLANDS

Richard Waverley saw no objection to this plan. But Richard's political friends thought otherwise, and the result was that the lad was offered, and accepted, a captaincy in a dragoon regiment, then quartered at Dundee, whither he set forth, carrying, among other things, a fateful letter of introduction from his uncle to the Baron of Bradwardine at his Perthshire seat of Tully-Veolan, on the borders of the Highlands. The baron was an old friend of Sir Everard's, and had borne arms on behalf of the Stuarts.

After being initiated into his military duties at Dundee, young Waverley gained leave of absence for a few weeks. He desired to see the country, but his first object was to visit his uncle's friend at Tully-Veolan, a typical old Scottish manor house. Here he received a cordial welcome from the baron and his daughter Rose, a sweet girl of about Waverley's own age. Her hair was of pale gold; her skin like the snow of her own mountains in whiteness. "Yet she had not a pallid or pensive cast of countenance; her features, as well as her temper, had a lively expression; her complexion, though not florid, was so pure as to seem transparent, and the slightest emotion sent her whole blood at once to her face and neck. Her form, though under the common size, was remarkably elegant, and her motions were light, easy, and unembarrassed."

It fell to the lot of Rose Bradwardine to perform the duties of hostess and guide combined. Thus the two were constantly in one another's company.

THE ENGLISH GENTLEMAN AND THE HIGHLAND LASS

She rode with him in the vicinity of Tully-Veolan, and listened with delight as he talked of the books he knew and loved. But while those who saw them together so frequently bethought them that the baron was arranging a match between his daughter and the wealthy young Englishman, Rose's father shut his eyes to possibilities in this direction.

If he had thought of an alliance, Edward's indifference would have offered a bar to the project. His mind was still full of the influence of the old romances he had read in the library at Waverley-Honour. His imagination still led him into mental adventures in which female forms of exquisite grace and beauty mingled. Rose Bradwardine, beautiful and amiable though she was, had not precisely the sort of merit or beauty which captivates a romantic imagination in early youth. She was too frank, too confiding, too kind.

"Was it possible to bow, to tremble, and to adore before the timid yet playful little girl, who now asked Edward to mend her pen, now to construe a stanza in Tasso, and now to spell a very, very long word in his version of it?" No;

but, for all that, time at Tully-Veolan passed so agreeably that Waverley applied for and obtained an extension of his leave of absence. The permission was accompanied by a hint from his commanding officer, Colonel Gardiner, to the effect that he should not spend too much of his leisure in the company of those who, estimable as they might be in a general sense, were not supposed to be friendly to the Government or the king, to whose service he had been sworn.

About this time it happened that Tully-Veolan was raided by one Donald Bean Lean, a Highland cateran, or robber, who carried off the baron's milch cows. Raids of this kind were of frequent occurrence on the Highland border, and a local chieftain, Fergus MacIvor, Vich Ian Vohr, received from many Lowland gentlemen what was known as "protection money," as a surety against the attention of these robbers. Between this chieftain and the baron there had been a quarrel. Rose's father suddenly discovered that he had unknowingly, through an agent, paid "protection money" to Vich Ian Vohr. Thereupon he had promptly stopped the payment.

How Waverley came to the haunt of the Highland robber

But after Donald Bean Lean's escapade, Vich Ian Vohr, who held the baron in great respect, sent to the master of Tully-Veolan, offering aid in the recovery of the missing cattle. This message was brought to Tully-Veolan by a kinsman of the chief's, Evan Dhu MacCombich. From the last-named, Waverley heard accounts of Highland ways and customs that stirred his love of adventure. When, therefore, Evan Dhu offered to conduct him to the stronghold of Donald Bean Lean and the home of Vich Ian Vohr, he decided to accept the invitation.

Waverley's journey in the company of Evan Dhu, and the latter's wild-looking companions, through wild mountain scenery, was one well calculated to appeal to his love of the romantic, particularly that part of it which took him at night-time in silence over the waters of an unknown lake to the robber's fastness.

On meeting Donald Bean Lean, Waverley was astonished, even alarmed, to find a person of this description so accurately informed of the strength and composition of the various garrisons and regiments quartered north of the Tay. His feelings were further played upon by the robber's mysterious language. Donald Bean Lean spoke as if Waverley had a secret message for him, and regarded it as a grievance that he was not thought worthy of confidence equally with the Baron of Bradwardine and Vich Ian Vohr.

Among the followers of "Bonnie Prince Charlie"

The meaning of all this Waverley was not to learn until later. Meanwhile he was hospitably entertained, and the only disconcerting incident was the disappearance of his seal. This was taken from him while he slept, and the outlaw used it as a sign of his authority to the recruits Waverley had taken with him to Dundee from Waverley-Honour, whom Donald Bean Lean urged to desert and to join the forces of Charles Edward, "Bonnie Prince Charlie," whenever they heard of the landing of this personage in Scotland.

After his visit to the secret hold of Donald Bean Lean, Waverley was escorted to Glennaquoich, the home of Vich Ian Vohr. He was received very cordially by this chieftain and his sister Flora. Flora MacIvor bore a striking resemblance to her brother. She had the same antique and regular correctness of profile, the same dark eyes, eyelashes and eyebrows, the same clearness of complexion. But the haughty and somewhat stern regularity of Fergus's features was beautifully softened in those of Flora. Her voice was soft and sweet, yet in urging any favourite topic it possessed the tones which impress awe and conviction.

The charming heroine who stood fast for the Jacobites

Flora MacIvor was most devotedly attached to the exiled Stuarts. To contribute to the restoration of their family to the throne, "she was prepared to do all, to suffer all, to sacrifice all." And Flora was as accomplished as she was beautiful.

At first there was nothing at Glennaquoich to tempt Waverley to take up the cause which Vich Ian Vohr and his sister had at heart; that is to say, he was not directly asked to throw in his lot with the cause. But one day he took part in a hunting expedition. This was

organised as a kind of prelude to definite action by the Jacobites. Waverley met with an accident which delayed his return to Dundee. But Donald Bean Lean had gone there, and while Waverley was at Glennaquoich, the Jacobite was tempting the men of his regiment to join him, and intercepting letters sent to Waverley by Colonel Gardiner, first of all advising, and then commanding, his return to duty.

How an English Soldier Joined the Scottish Rebels

At last despatches reached Waverley. They contained matters of very deep interest. His father wrote complaining bitterly of bad treatment at the hands of the Government. There was a long-delayed letter from Colonel Gardiner commanding his return to Dundee within three days. Then his uncle and aunt wrote asking him to resign his commission rather than render himself subject to such treatment as that which had been meted out to his father. From a newspaper put into his hands by Vich Ian Vohr, Waverley next learned that he had been deprived of his commission.

Regarding himself now as a man greatly wronged, one who had been publicly disgraced without a hearing, Waverley threw in his lot with the Highlanders. By this time Vich Ian Vohr had observed, with no little satisfaction, the growing attachment of Waverley to Flora. He saw, indeed, no bar to their union save the relations between Waverley's father and the Government, and his guest's commission in the king's army. These obstacles were now removed.

Waverley Meets the Pretender to the British Throne

On her part, if she entertained any feeling other than friendship for Waverley, Flora MacIvor did not show it. And, strongly attached as she was to the cause of the Stuarts, she appreciated the risk involved by the rebels, and bade Waverley consult his reason—not his resentment nor his feelings in regard to herself—before he decided to join them. But the resentment, or the feelings, or both, gained the day.

Thus, it happened that Waverley was introduced by Vich Ian Vohr to the Young Chevalier. And the personal charm of this unfortunate young man completed his conversion. Meanwhile, Flora used her influence to make Waverley think more intimately of her friend, Rose Bradwardine, ignorant of her own brother's attachment to the baron's daughter. Between love and war, Waverley was carried almost breathlessly along in the train of the rebellion. He took part in the victory of the Highlanders at Preston-Pans, and in this battle saved the life of his uncle's friend, Colonel Talbot.

There was another incident of the battle which made a grave impression on Waverley's mind. This was the death of Colonel Gardiner. The colonel, sorely wounded, was maintaining a desperate and unavailing resistance against a strong body of the Highlanders when Waverley saw him.

The Death of Waverley's Colonel on the Field of Preston-Pans

"To save this good and brave man became the instant object of his most anxious exertions. But he could only witness his fall. Ere Edward could make his way among the Highlanders, who, furious and eager for spoil, now thronged upon each other, he saw his former commander brought from his horse by the blow of a scythe, and beheld him receive, while on the ground, more wounds than would have let out twenty lives."

After the battle of Preston-Pans Waverley marched with the rebels into England. He was with them in their enforced return, till the disaster at Clifton, where Vich Ian Vohr was taken prisoner. Then he was separated from them. Unflinchingly loyal to the cause he had espoused, Vich Ian Vohr met his death within the grim walls of Carlisle Castle. Broken at last in spirit, Flora MacIvor, lamenting that she had urged her brother on to his terrible end, sought refuge in the convent of the Scottish Benedictine nuns in Paris. Waverley was pardoned and his life was saved largely through the affectionate devotion of Rose Bradwardine, whose kindness to the outlaw's daughter was the means of bringing to light Donald Bean Lean's treacherous use of Waverley's letters and signet.

A wiser and an infinitely stronger man for his adventures, Waverley married Rose Bradwardine, and became master of Waverley-Honour.

The next stories of Famous Books begin on page 1599.

"PRINCE CHARLIE" THE YOUNG PRETENDER

Charles Edward Stuart, the grandson of James II. of England, was familiarly known to his followers as "Bonnie Prince Charlie," while his enemies called him "the Young Pretender." His father before him had attempted to regain the British throne, from which his grandfather had been driven, and the young man himself, in the year 1745, went over from his refuge in France to place himself at the head of his faithful followers in Scotland and to descend upon England in a final effort for his lost throne. Edward Waverley was an English officer who joined the cause, the unhappy story of which is told in Sir Walter Scott's great romance of "Waverley." This fine painting of Bonnie Prince Charlie and two of his followers is the work of John Pettie, R.A.

Photographed by Caswall Smith

SIR WALTER SCOTT'S HOME ON THE TWEED

Here is a picture of Abbotsford, the picturesque home of the great novelist, Sir Walter Scott. Abbotsford was the pride of Sir Walter's heart. He purchased the place in 1811, and on it he built his home, adding to it from time to time, until it became the imposing gabled mansion we see in the picture. It was at Abbotsford that Scott wrote the Waverley novels, and it was here that he died.

HOW TO MAKE PERFUME FROM FLOWERS

CONTINUED FROM 1354

We all know that scent is made from flowers, and we have often wanted to try to produce some for ourselves. Perhaps we have shaken a few petals up in a bottle with some water, and then have been disappointed that the liquid did not possess the same fragrance as the perfume which we put on our handkerchiefs. Our failure was simply due to the fact that we did not set about the matter in the right way, and if we follow a process which is much after the lines on which the real scent-producers work, we shall meet with more success.

In the first place, it is necessary that we should gather the petals of roses, violets, or other blooms soon after they are open, and when they are quite dry. In order to make certain that there is no moisture on the blooms, it is a good plan to spread them out on a tray for a few minutes. While they are drying we may start the next stage in the process of the perfume making. We shall need some of the best Lucca oil for this purpose, and it is well to use that which is sold for table purposes, as the commoner sorts are not so pure.

Now get a sheet of wadding, and out of this cut some pieces of the material which shall be of a size to slip into a three-pound glass jam-jar. It is easy to round them off with a pair of scissors so that they fit into the jar quite easily.

The next step is to get a good-sized pie-dish, and into the bottom of this put some of the pieces of wadding, and then pour on a quantity of the oil. See that the bits of cotton-wool become thoroughly soaked with the oil, and when you have got ready about eight or a dozen pieces in this way, it is time to fetch the petals which we left on the tray. Now get your jam-jar and be sure that this is quite clean, and at the same time ask cook to let you have a small handful of salt. When you have all the things around you, you may start the next stage in the making of the scent. First of all sprinkle a thin layer of salt on the bottom of the jar, then cover this over with petals, and on the top of the petals place one of your pieces of wadding which has been soaked in oil. Then put some more salt, another layer of petals, and one more piece of wadding, and so on until the jar is quite full. It is now necessary to make sure that the jar is perfectly air-tight, and the best way to bring this about is to tie a cover of grease-proof paper very tightly round the opening. Perhaps it will be as well to put the paper in two thicknesses, so as to be quite certain that no air can come in.

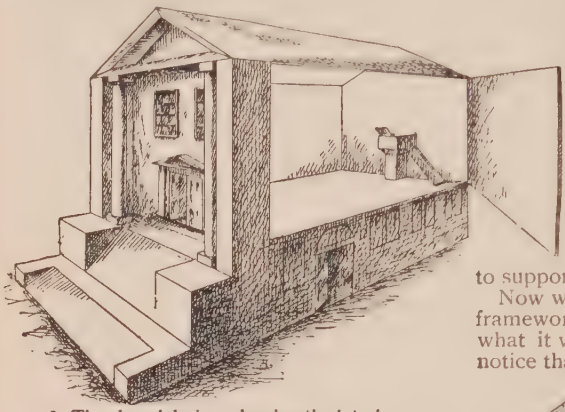
At this point the jar should be removed to a warm place, if possible where it will get plenty of sunshine. Remember that the more the sun shines on the petals the more likely will you be to get the best of the fragrance from the flowers.

The jar of petals must now be left as it is for at least a fortnight. At the end of fourteen days the cover may be taken off the jar containing the flowers. The thing to do next is to press the oil from the layers of wadding, and this will be found to smell like the best scent, according to the kind of flowers which have been treated. If roses have been used, the perfume will smell of these flowers, and so on. It is rather difficult to get all the oil out of the contents of the jar, and the easiest way is to use a big spoon, putting this inside and then pressing the layers as hard as we can. If, after doing this, we tip the jar up, the oil will trickle down into a bottle or anything we may have underneath. It will be found that this scent will keep almost for any time if kept in a well-stoppered bottle. A few drops placed on a handkerchief will give a splendid fragrance that will last a good deal longer than many of the cheap scents which are purchased.

After we have learned how to make the simple scents by the use of one kind of flower, it is interesting to try to prepare some combination perfume. As a matter of fact, nearly all the shop scents are produced by blending several scents together. A very pleasant perfume may be obtained, if when treating the rose leaves we scatter a few lavender blossoms on each layer; whilst in the same way rosemary leaves and violets will give us quite a fresh scent.

MAKING THE CHAPEL FOR MODELTOWN

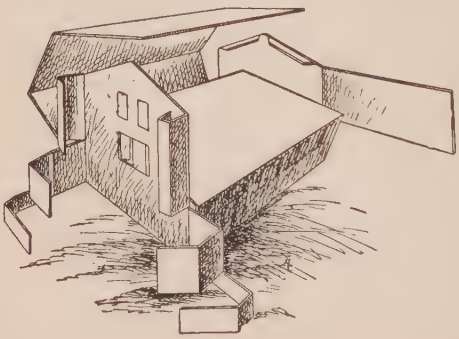
MODELTOWN CHAPEL is a much plainer edifice than Modeltown Church, yet it will give us good scope for neat and careful work. Our chapel is in two floors, the upper floor being the chapel proper, and the lower or basement floor being a hall to be used for lectures, Sunday-school, and many week-day meetings. Then we shall provide a small store-room at the back, where we shall suppose the heating furnace to be placed that will heat the water to circulate through the pipes in the chapel and the hall.



1. The chapel design, showing the interior

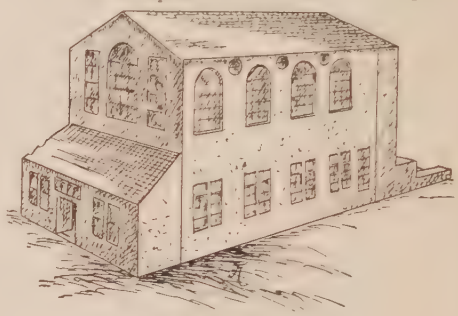
Picture 1 is a view of the chapel from the side, but it shows the front with its steps, pillars, and entrance-door; and the side is shown open, revealing the pulpit with its stair and reading-desk. Picture 2 represents the opposite side, and shows the store-room in the rear.

The main plan of the chapel is given in pictures 4 and 5. We draw both of these on card, remembering the meaning of the three kinds of lines as explained on page 446. The pictures are one-third scale, so that we must make our drawings on the card by using scale-rule C to take the measurements from the picture, and the full-sized rule to make our lines on the card. Having cut out both pieces, we glue them together at the places marked A and B on each, the folding slip on the smaller piece being attached by glue to the edge of the floor of the larger piece. We must be careful when cutting the dotted lines half through, because in many of them the half-cuts are made not upon the side of the card upon which the drawing has been made, but upon the opposite side, so that the bending may be done in the opposite direction. The lines which have to be half cut on the back of the card are those in the front portion of the building, and they are marked with a tiny circle at each end, so that we may recognise them. Having cut out the card, and before we bend it up, we glue inside the walls, at the place marked floor-line, small slips of wood. Large wooden matches, from which the heads have been cut off, will do nicely. We shall glue two to the side wall to which the roof is attached, and one to each end wall. The purpose of these wood slips is to support the floor, as we shall see.



3. Folding up the walls

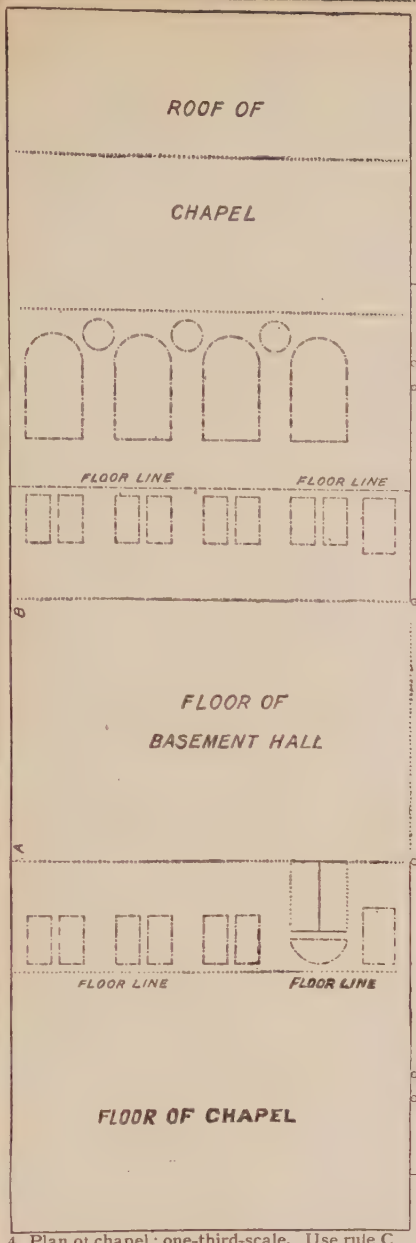
Now we can fold up the card to form the framework of the chapel. Picture 3 shows what it will be like as we do so. We must notice that the part marked floor in the plan



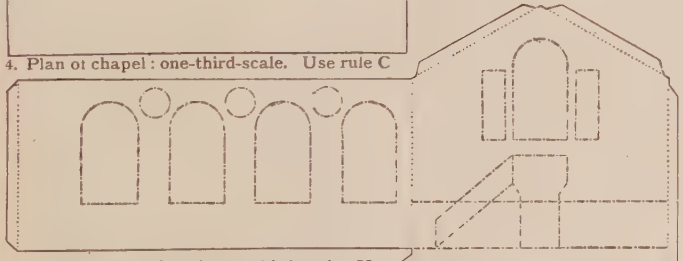
2. Chapel showing back

folds right into the building and rests upon the wood splinters that we have glued to the far side and to the ends. We glue the ends to the roof, leaving the full side wall to open and shut, as seen in picture 1. We must give particular attention to the front, bending the wings round as shown in picture 7. A touch of glue on the ends of the wings, where they touch the front of the chapel, will give them sufficient adhesion until the steps are put in. We must be careful to have the folded wings with their sides quite parallel.

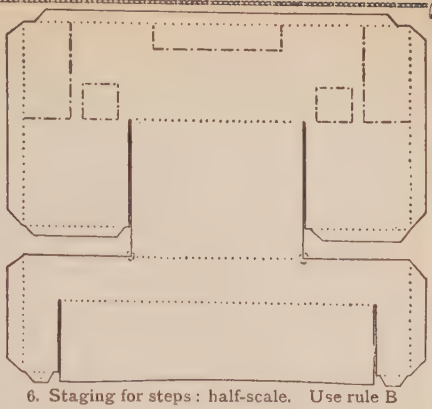
The staging to make the steps is given in plan in picture 6, which is half-scale, so that we use scale-rule B to take our measurements from the picture, and the full-sized rule on our card. The dotted line marked with a circle at each end is to be half cut on the back of the card to enable it to be bent in the opposite direction. Having cut and folded this part into the form shown in picture 9, we fit it into the front of the chapel, and its position and appearance, when fitted so, is shown in picture 1. As there is no floor in this part of the building, it is easy to fix the steps properly, as we can work at it from below.



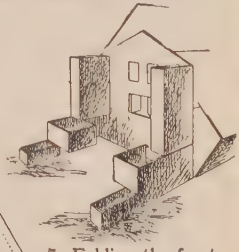
4. Plan of chapel : one-third-scale. Use rule C



5. Part of plan of chapel : one-third-scale. Use rule C

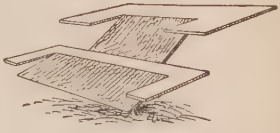


6. Staging for steps : half-scale. Use rule B



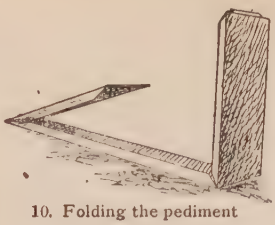
7. Folding the front

8. Pediment one-third scale Use rule C

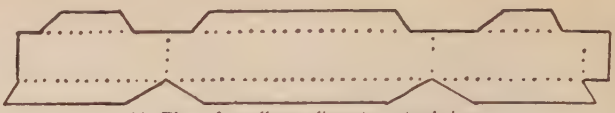


9 Folding the front steps

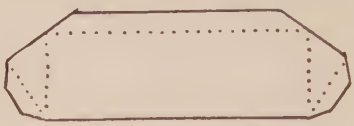
PLANS FOR A CHAPEL IN MODELTOWN



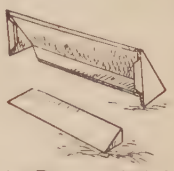
10. Folding the pediment



11. Plan of smaller pediment : actual size



12. Doorstep : actual size

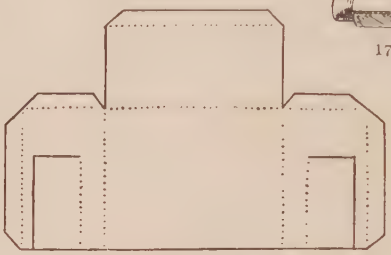


13. Doorstep folded

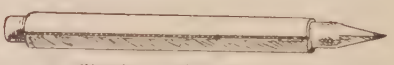
15. Bending a pillar end

14. Pillar ends : actual size

16. Plan of pillar : half-scale. Use rule B



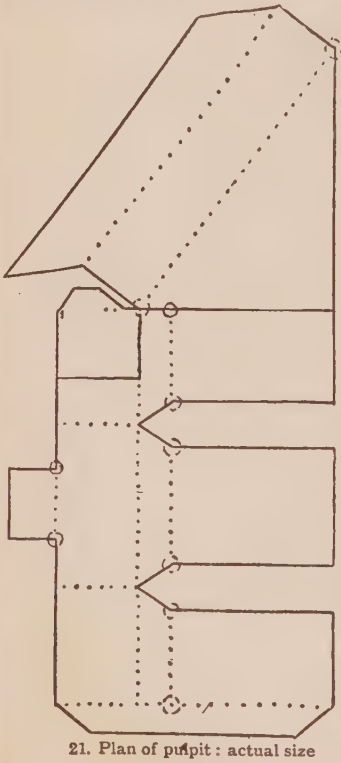
18. Plan of lobby : half-scale. Use rule B



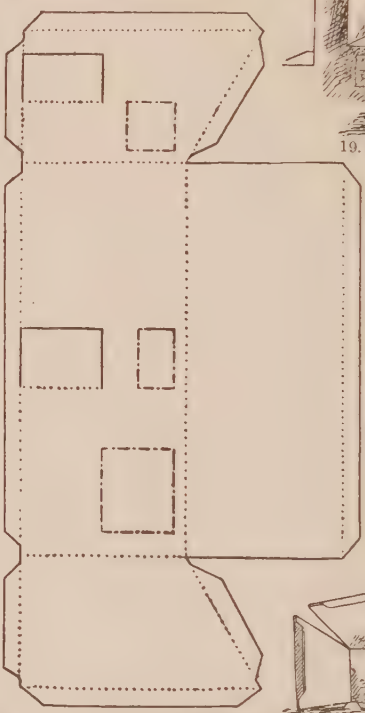
17. Shaping a pillar round a pencil

19. Position of lobby

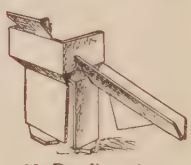
20. Bending the lobby



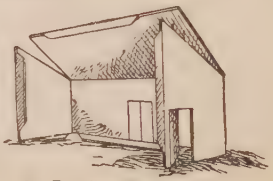
21. Plan of pulpit : actual size



23. Plan of store-room : half-scale
Use rule B



22. Bending the pulpit

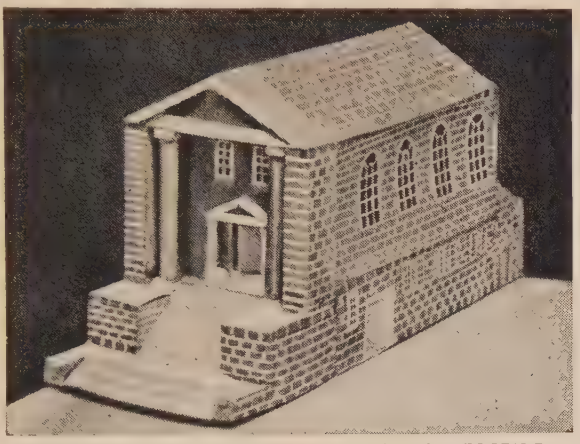


24. Bending the store-room

In picture 1 we see at the top of the front of the chapel a triangular piece. This is called in architectural language a pediment. We shall now make and fix this piece. Its plan is shown, one-third scale, in picture 8, so that in drawing it we use scale-rule C to take the measurements from the picture. As it is being folded up, after having been cut out, the pediment will be like picture 10. Now we place it in position and glue it above the square side pillars of the front, as seen in picture 1.

There is a smaller pediment above the chapel door, as may be seen in picture 1. The plan for this is given full size in picture 11, and we therefore make our model the same size as the plan. We bend it up exactly as we did the large pediment, and as seen in picture 10. We glue this above the door, as shown in picture 1. Then the step in front of the door is shown in plan in picture 12, which is given full size. When cut out and folded up, it will be as shown in picture 13, which shows it from the back as well as from the front. Its position below the door is seen in the general view in picture 1.

We now make neat round columns, or pillars, one for each side of the front door. The plan in picture 14, which is full size, is for both the tops and bottoms of the two round pillars seen in picture 1. We therefore draw this plan four times on our card, making it the same size as in picture 14. When being bent into position, the column ends will look like picture 15. The columns proper, which go between the top and bottom pieces, are made round by bending them round an ordinary lead pencil.



MODELTOWN CHAPEL, MADE AS HERE DESCRIBED

First we draw and cut out twice the plan in picture 16, to give us two columns. The picture is half-scale, so that we use scale-rule B to take our measurements, and the full-sized rule to make our lines on the card. Picture 17 shows the pillar being bent round the lead pencil. The card must be folded round the pencil tightly, and the last half-inch or so, where the card goes over itself, must be glued so as to make a tiny tube. We must be careful, however, to see that no glue goes on the pencil itself, or we should not be able to withdraw it afterwards. When the glue has set, we take out the pencil, which should be easily done. There would be no harm in leaving the pencil in the pillars if we cut it off so as to be the exact length of the cardboard covering. We glue to the building the four small pieces which we made from the plan in picture 14. Their position is seen in picture 1. Then we put a little glue on the ends of the two pillars that we have made, and slip them into their proper places, as shown also in picture 1. That completes the structural part of the front.

We now turn to the interior, and make the lobby. The plan of this is shown in picture 18, and its position, when completed and fixed, is seen in picture 19. The plan in picture 18 is half-scale, so that we use scale-rule B to take our sizes, but, of course, make our drawing with the full-sized rule. When we have cut out the card and are bending it up it will appear like picture 20, and when properly glued to the inside of the chapel at the door it will be like picture 19. As we left one side of the chapel wall to open, we can attach the lobby and also the pulpit that we are about to make without much difficulty.

We have now only the pulpit to make in order to complete the interior of the chapel. The plan is shown full size in picture 21. Therefore, when cutting it out, we use only the full-sized rule both for taking the sizes from the picture and in making the drawing. The pulpit, when being bent up, will be like picture 22. We must notice that the dotted lines with the small circles at end have to be half cut through on the opposite side of the card from the drawing, so as to be bent in the opposite direction. The plan in picture 4 shows where the pulpit is to be placed, and picture 1 shows it glued into position. To make the pulpit properly we must be careful to fit the corners neatly, because, if we do not join them exactly, the pulpit will look twisted. We could not expect a preacher in Modeltown to preach from a twisted pulpit.

We have now only the store-room to make and attach. The plan in picture 23 is half-scale, so that we use rule B to take the measurements. When cut out and being folded up, the store-room will be as seen in picture 24, and when attached to the building the whole will look as seen in picture 2. This completes the building of our chapel. We can finish it in any way we find artistic. This style of building will look very well if the walls are made red, the windows the usual blue, the doors green, and the roof dark grey to imitate slate. The last picture is a photograph of a chapel made from the instructions which we have just followed.

Our next task will be the building of a parsonage in which the minister in charge of our chapel may live.

SIMPLE KITES AND HOW TO MAKE THEM

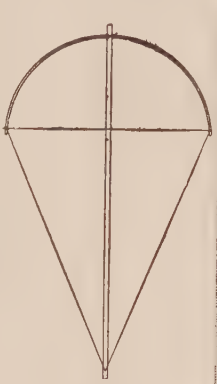
THERE are many different kinds of kites. Some are very simple, and these we shall see how to make in this article. Others are made to resemble ships, dragons, and other things, and for the way to make these readers must consult the index.

The ordinary kite is made with very simple materials, and its manufacture costs very little indeed. First, we require the half of a hoop. The size of the hoop depends upon the size of kite we are going to make, or, rather, the size of kite that we shall have will depend upon the size of hoop that we use. A hoop from a butter-keg will do very well for a small kite, and any grocer will be glad to give us one if we ask him, without expecting any payment for it. We do not use the whole hoop, but only a piece a little smaller than half of it. We choose the best part for this purpose, and cut away the remainder. Then we thin the half-hoop with a pocket-knife, taking care not to take off enough to weaken it much. We must thin it equally all round, and we should test it to see that we have not made it lighter at one side than at another. The way to test it is simple. Take a piece of string and put it round the outside of the half-hoop, then cut it off to the exact length of the half-hoop. Double the string then, and again put it round the half-hoop as far as it will go from one end. Make a notch with the penknife where the end of the doubled string comes. Then balance the half-hoop on the edge of the knife-blade at this point, as seen in picture 1. If the half-hoop hangs evenly, and does not hang down at one end more than at the other, it is all right; but, if one end hangs down more than the other, we must shave a little more wood from the heavier end, so as to make it the same weight as the other end. When we have got the half-hoop thinned properly and balanced, we make a notch at each side of each end, close to the end, as seen in picture 2, and put it aside till the backbone of the kite is ready. We require for the backbone a length of wood that will be strong and light. A piece of thin cane will do nicely if it is rather stiff.

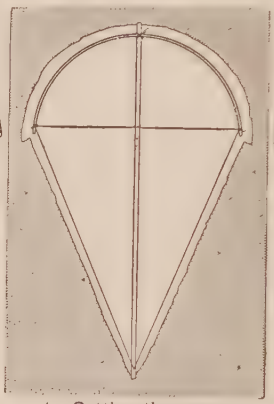
1. Testing the top

2. Top with notches

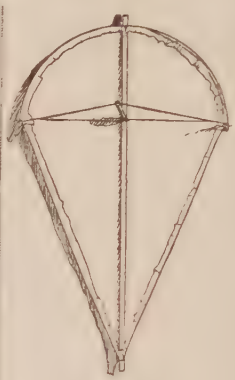
But a long slip of wood—say, from 24 to 30 inches long—will do about as well. We thin and smooth this slip, and then tie it to the notch in the centre of the half-hoop, so as to leave 1 inch sticking up beyond the top of the half-hoop. Picture 3 shows the kite at a later stage, but shows also the position of the hoop and the backbone. Now tie a thin, strong string to one end of the half-hoop, or top, as we shall now call it, at one of the end notches, pass the string once round the backbone, and the other end tie to the notch in the opposite end of the top. Balance the whole by placing one end of the backbone on one forefinger, and the other end of the backbone on the forefinger of the other hand. We can then see if the top swings heavier at one side than at the other. If one side is heavier, we move the backbone along the string a little bit, until we find from the swing that it is right in the middle between the two ends of the top. Picture 6 shows how we test the balance.



3. Frame of kite

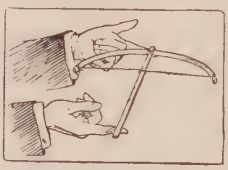


4. Cutting the paper



5. Strut in position

Having done this, we join each end of the top with string to the bottom end of the backbone, where we put a notch or a hole to receive the string. The kite now looks like picture 3. All the strings should be fairly tight.



6. Testing the balance

We now get a large sheet of thin, strong paper. A sheet of a large newspaper would do, but imitation parchment paper, if we can get it, is stronger and better. The paper must be large enough to cover the entire kite from top to bottom and from side to side. If the only paper we can get is in too small sheets, we can make one sheet large enough by pasting two or more pieces together at their edges.

We place the kite on the top of the paper, on a table or on the floor, and, with a pencil, draw a line round the kite, about 1 inch outside the hoop top, and ½ inch outside the

string sides, as seen in picture 4. Paste or gum the edges of the paper, and fold it over, and stick it down. Turn it over carefully, and stick on two or three patches on the back, thereby sticking the backbone to the covering paper and strengthening it. The kite is made, and we may prepare to fly it.

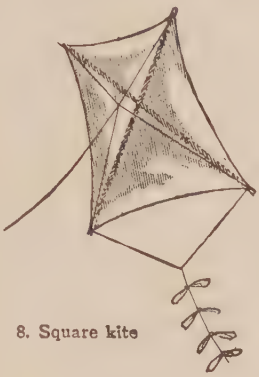
Tie a string at the back from side to side, from one end of the top to the other end of the top. Take a piece of wood about 4 inches long, and, having cut a notch in each end of it, fit it between this string and the backbone with one end on each. From the back, the kite will now look like picture 5

Tie a string from top to bottom of the backbone in front. This is the bridle. It must be slack, so that the kite will fly properly.

Tie another piece of string to the lower end of the backbone and let it hang loose—say, about 5 yards long. This is the tail. Make some loops in the tail right down, 2 feet apart, and put in tufts of paper, and then pull the loops tight. These tufts are streamers, and make the kite look well when we fly it.

The kite is now ready for the field. We take it out when the wind is fairly strong. We should have a ball of string, or more than one ball, wound upon a stick. Tie the end of this string to the bridle so that the kite hangs horizontal when suspended, and tie a piece of turf to the end of the tail. One boy takes the kite by the bottom end, leaving the tail lying free. Another boy takes the ball of string to which the kite is tied, and goes away about 10 yards in the direction from which the wind is blowing. Both stand and wait for a breeze. Then, as the boy with the kite cries "Go!" he throws the kite violently forward into the air, and his friend runs his best. Then, if it has all been properly done, the kite soars aloft steadily in the wind, and the string can be let out carefully and gradually. If the kite does not rise, the tail may be too heavy, and some of the turf must be taken off. If it wobbles, or rushes from side to side, the tail may be too light, and a heavier piece of turf must be put on the tail.

7. Flying the kite



8. Square kite

That is, perhaps, the simplest form of kite. A square kite is another very simple shape, and is shown in picture 8. From this picture, and from the description of how to make the kite we have seen, we can make a square kite without further instructions.

EMBROIDERING A POCKET-HANDKERCHIEF

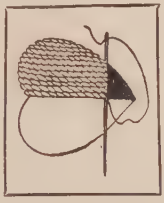
HANDKERCHIEFS may be spoilt by unsightly marking, and it certainly is a pity to ruin a beautiful white cambric one by blotched initials in ink. Let us see how the marking may be plainly and yet artistically done in embroidery.

We can buy a dainty hemstitched handkerchief for 25 cents, and all we shall then require will be a pair of hoops and a spool of ordinary embroidery thread, and, if we cannot draw ourselves, a transfer design for the corner of a handkerchief (some small design such as shamrocks or forget-me-nots is most suitable) and some initials. These would cost but a few cents.

We shall, perhaps, find it easier to start with initials instead of a monogram, which is, of course, two or more letters twined together.

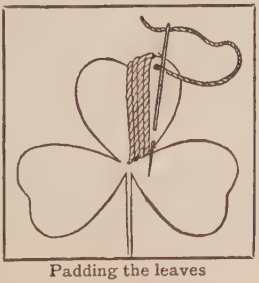
We will start by pinning the pattern across one corner of the handkerchief, taking care that the shiny side is lying on the cambric. This we must press with a moderately hot iron. We then remove the paper and pin the initials inside the circle of shamrocks that we have ironed on to the corner.

To embroider handkerchiefs successfully we take the two small wooden hoops, which fit tightly over one another, stretching the design over the smaller one and fastening the larger over the handkerchief, so that now the cambric looks like the top of a drum or a tambourine. Working on hoops will keep us from puckering the work, and until we have had a little practice this is difficult to avoid.



Satin stitch

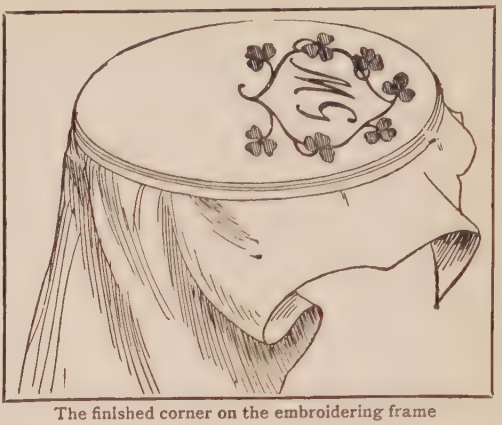
When these preparations are made, we can begin the actual work. First we cut a short thread from our spool, and we find that each thread is divided into several strands. Let us thread our needle with four of these strands to do the padding. We pad the flowers and letters to raise them up and to make them firm.



Padding the leaves

Suppose we are going to work shamrocks round our initials. These are three small leaves of

about the same size joined together on one stem, and a line or vein runs down the centre of each leaf. Our first work will be to pad the leaves by taking a tiny stitch at the bottom of the right-hand half of the leaf, and with the thread lying across the leaf making another small stitch at the top, again leaving the thread on the upper side of the work, and crossing over the first stitch. And so we go on crossing the stitches on the right side, weaving the needle in and out till the half-leaf is padded thickly in the middle and thinly at the sides. The line for the vein must be left distinct. We can then pad the other half of the leaf in the same way. Now we must begin to work over the padding with satin stitch, very evenly, beginning at the bottom of the right-hand side of the leaf, and working to the top, and then from the top of the left-hand side to the bottom, so that these stitches go the reverse way to those of the padding. We put them very close together so that none of the padding shows through, with the line down the middle clear.



The finished corner on the embroidering frame

When we have finished the leaves, we can work the stalks over and over the blue line with tiny stitches, and as near together and as even as possible.

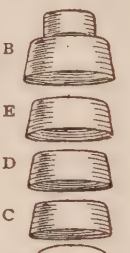
At last we can begin the initials. Pad the thick parts of these letters carefully, taking only two strands of thread in the needle. We must pad, too, with small stitches, and weave them over one another so as to keep them smooth. Then we work them over from left to right with satin stitch, using two strands of thread and placing each stitch close to the other. Work the full-stop with tiny satin stitch.

HOW THE CONJURER MAKES HIS MONEY

EVERY boy has a liking for bright dimes, so I am going to tell you a way of making them for yourselves, not imitation coins, but real good money. The only drawback about the process is that each dime you make costs the same amount to produce, but you need not tell your friends that.

1. The conjurer's mint

To coin money, of course, you need a "die." The die, in this case, is in two parts, as illustrated in picture 1—a sort of little anvil (A) and a cover (B), the one fitting over the other. With this are used three "blanks" of bright metal, supposed to be silver, but in reality tin. To show the trick, you put one of these on A, which is just large enough to receive it, and cover it with B. You stamp it by bringing down one end of your magic wand smartly upon it. If you don't happen to have a magic wand, a ruler or even a lead pencil will do just as well. You now lift off the upper die, when the blank is found to be transformed into a bright dime. You take this off, put another blank on the little anvil, cover it, and stamp it as before. When the upper die is lifted, the second blank has been coined into a dime. Once more the process is repeated, and a third dime is the result. The secret lies in the construction of the little anvil (A). This looks like a solid bit of brass, but it isn't. Instead of being all in one piece, as it appears to be, it consists of four distinct parts (A, C, D, E),



2. The anvil

as shown in picture 2. These are, in fact, mere shells, fitting one over the other in regular order. The cover (B) has no speciality.

To prepare for the trick you must, in the first place, provide yourself with three ten-cent pieces, the newer and the brighter the better. One of these you place on A, and cover it with C. You place another dime on C, and cover it with D; and, lastly, place the third coin on D, and cover it with E. So arranged, the whole looks exactly as A does in our first picture.

To show the trick, you lay the first of your blanks on E, and cover it with B. After stamping it as already described, you lift off B, pressing its sides lightly. The effect of this is that E comes away inside B, carrying off the blank between them, and leaving the uppermost dime exposed. The process is repeated for each dime.

The little apparatus, which is known as the Magic Mint, and is sold at 25 cents, is so neatly made that, when duly prepared with the needful dimes, you need have no fear, unless you are exceptionally clumsy, of lifting off more than the proper shell or shells. A hint may be given to the grown-up reader. Apart from its attraction for the juvenile performer, this will be found an admirable trick for exhibition by good-natured uncles or other relatives, the dimes being in this case presented to the spectators, proof positive of "no deception."

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO AT THE END OF AUGUST

EVERYBODY admires those beautiful upstanding white lilies, often called the "Madonna lily," that flower so well in certain gardens. You will want a clump of them in your garden, and the present time is the best to move them.

We have only to wait until the flower-stem pulls away quite easily to know that the bulb below has gone to rest. This it does only a very short time, and long before the autumn has gone they will send up fresh glossy green leaves. The right thing is to catch them just at the time when they are making no growth, when they will not feel the check of transplanting.

If stable manure is put into the hole dug to receive them, it should be well mixed with the soil, and for two or three inches below the depth the lilies are to be planted, soil and no manure should be placed. The best manure for the purpose is that which, earlier in the year, has been used for a hot-bed, for rank, fresh manure should never come anywhere near your lily-roots.

We need not be afraid to plant these lilies in a border that gets very dry in summer, so long as they get plenty of moisture during the earlier months of their growing period; that, at any rate, is my experience after experimenting with them.

Talking of experimenting reminds me that this is one of the great joys of gardening; if a plant looks sickly and refuses to flower well, and you have it growing in a shady place, just mark that plant, and make up your mind that as soon as the autumn arrives you will dig it up, and try it in a more sunny position. Or perhaps you have a plant that at present is growing in too sunny and dry a position, and seems to be longing for cooler quarters—well, let these two change places, and next year notice the result.

By this time the dahlias will be opening their flowers, and in many British gardens earwigs become a woeful pest. Fortunately we do not have this troublesome kind of insect in the United States. Here and elsewhere, however, the tarnished plant bug is responsible for one-sided flowers and blasted buds, causing them to die, but otherwise dahlias have few enemies.

Some flowers do not fade, and for a long while may be used in winter bouquets. Such are the sea-lavenders, that we generally know as *statices*, everlasting flowers, and a curious thistle-like plant bearing a silvery flower that we call carlina. If you can find this plant growing in any park, or anywhere that you can notice it from time to time, do so. The silvery flowers open only when the sun is upon them; and it is said that they close so regularly at the approach of rain that the Germans call them weather prophets. They are quite easy to grow from seed.

We shall wish to pick all the flowering stems of our sweet-smelling lavender, and we ought not to wait until the flowers are past their best. Some of us will like to make lavender bags to put in our linen drawers; in that case we should gather the heads on some fine, warm day when they are quite dry, and, having rubbed them free of the stalks, we may sew them up in bags.

The gladiolus, which in the plural we call gladioli, will be among the gayest flowers of the garden at this time. They will require plenty of water if the weather is dry, and when the flowers have faded the flower-stem should be cut out. Unless they are especially needed for sowing, it is better not to let the seeds form, as the ripening of these requires a good deal of the strength of the bulb below.

Carlinas Gladioli Madonna lily

Some people *do* grow even the plants that have bulb roots from seed, but in most cases it is a long business, as most bulbous plants, as we call them, require *three* years from the time they are seedlings to the time they flower.

You have already been told to pull off the pods from the sweet peas, but it should be added that this requires careful doing. Whether we are picking peas for the vegetable tureen, or peas from our row of sweet peas, which are certainly not for the vegetable tureen, it will *not* do to take the pod between the fingers and pull or jerk it off. No, indeed, because the chances are that in pulling off the pod we pull up the whole plant by the root. The right way is to use both hands—with the left hand take hold of the stem below the pod, and with the right pull it off.

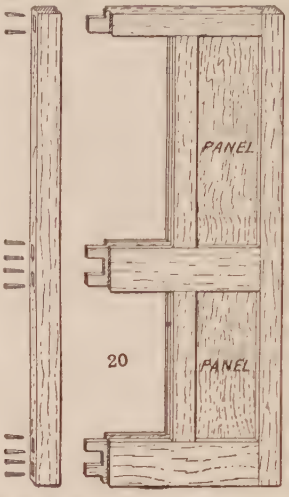
By this time in the summer our plants will have become large, and even yet we may have a few things that have not yet begun to flower, such as the late-sown French marigolds, perhaps, and the Michaelmas daisies, and chrysanthemums. If any of the plants that are ceasing to flower are crowding upon these, it is well to cut them back and give room and air to those plants yet to flower.

We should always be taking thought for our plants, humouring them, as it were, and tempting them to do their best.

MORE KINDS OF WOOD JOINTS

THE joints which have so far been described on page 1345 are not suitable for every kind of woodwork. Others are wanted for thin or shallow articles, and these we are now going to show how to make.

MORTISES AND TENONS. Think of the joints of a common door as shown in picture 20. You can see, if you look at its edge, that projecting parts on the *rails* or cross bars come right through the upright pieces. The projections are *tenons* and the holes are *mortises*. You see that the object sought is not only to make a very strong fitting of the corners, but also to secure the strongest directions of the *grain*. For just suppose that a door were cut out of a very wide board, or glued in two widths of board, you know that it would curve and shrink and crack in the warm house. It might be stiffened with cleats or strengthening pieces as back doors are, and as shown in picture 31, but of course that would be too unsightly for the rooms. It is made by framing together with mortise and tenon joints, and this gives long grain both up and down and across the door; so it will retain its shape and dimensions for a hundred years. Many other articles besides doors may be made by the aid of this very useful joint. You will notice that the central portions of a door are filled in with *panels* of thin wood. They are not nailed, or tenoned, or glued, but fitted into grooves in the bars; consequently they are free to shrink, without splitting. *Mouldings* are generally fitted round the panels only because they look nicer than plain edges. The corners of the mouldings are fitted with mitred joints, and they are fastened in with glue or nails.



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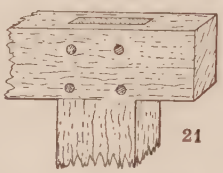
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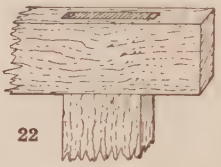
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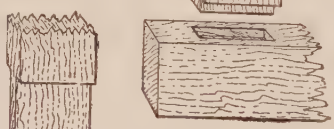
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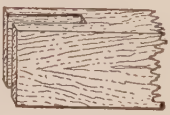

26

27

There are numerous differences in the forms of tenons, varying with their position and the dimensions of the wood. They are fitted not only at corners, but away from ends, and the tenon may go right through, or only a portion of the way.

The tenon in picture 21 is glued, and secured also by driving pins or wood pegs through from one face. Sometimes these are used without glue. It is chiefly large joints in rough carpentry that are pinned. This is the old method, adopted before such things as nails, screws, or bolts had been invented. The usual way now is to glue and wedge tenons into their mortises as in picture 22, where the mortise is cut tapering to allow for the wedges. The tenon is glued, and pulled, or *cramped* tightly up to its shoulder in the mortise, and then the wedges are dipped in glue and driven in from the outside. Wedges may go either at the edges of the tenon as in picture 23, or into sawcuts in it as in picture 24

STUB TENONS. Tenons may go right through as in pictures 20, 21, 22, or a portion of the way only as in 25, being in the latter case termed *stub* or *stump* tenons. These joints are used generally away from ends when the strength of the structure does not depend on them, but on other joints.

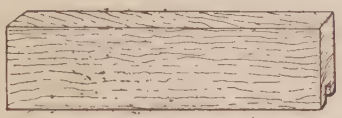
END TENONS. An end tenon seldom goes through as in picture 26. Such a fitting is neither strong nor neat. The tenon is reduced in width as in pictures 20 and 27.

TONGUED JOINTS. The method of fitting the panels into the door as in picture 20 is one which is used very much. A framed and panelled structure is the neatest and strongest which can be made. You can see examples in the furniture in your house, in the chiffonniers, sideboards, and cabinets, but it is too costly for some cheaper classes of work. If the carpenter comes to build a little office in one corner of your father's warehouse, or to divide one bedroom into two smaller ones, he does not generally frame the partitions like a door. He uses matchboarding as shown on end in picture 28. Here narrow boards are laid edge to edge, and all the edges fit each other by tongued joints. The boards are thus kept nicely level by the tongues fitting into the grooves, and the whole like one great broad piece of wood. Yet

they do not shrink or crack, because each piece is very narrow.

The tongues and grooves are made in various shapes, but the most common is the plain form shown. In this the tongue is planed on one edge of the board, and the groove is *ploughed* out of the other. Sometimes both edges are grooved, and the tongue is a separate strip of wood fitting half-way into each. This is the usual way when tongued joints are planed by hand. In picture 29 the pieces are separated, but the tongue is in the lower groove. Sometimes such a joint is glued, and sometimes put together without it. Partitions and floor-boards are not glued, but smaller work generally is. Edge glued joints are often made plain without tongues, but are much stronger with them.

28



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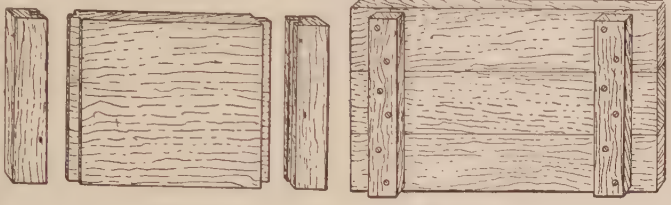
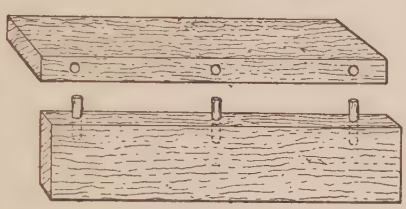


30 31

Another example of tonguing is shown in picture 30. Its object here is not to increase the width of the wood by joining edge to edge, but to prevent a broad piece from warping by fitting cleats to its ends. Drawing-boards are usually made like this. Another way both to prevent warping and to hold boards edge to edge is to screw or nail cleats across one face as in picture 31. It is the crossing of grain in these two last examples that strengthens the broad surface. The method shown in 31 is a much stronger way than that in 30, but 30 is neater.



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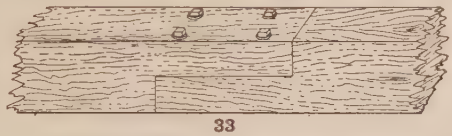

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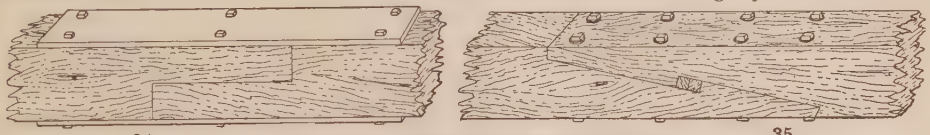

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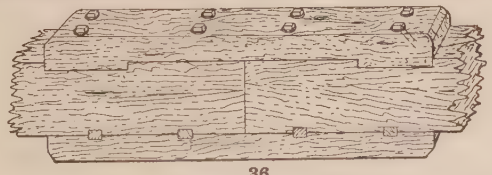

36

The Dowelled Joint. If you happen to have a broken chair in the house, one of those with the light-looking curved backs, you will see another kind of joint. A round pin on one part fits a hole in the other. You see at once a resemblance to the tenon and mortise. The round dowel does not cut away too much wood, and when glued properly, it makes a joint as strong as solid wood. A well-made chair is good for a generation. Dowels are suitable for joining all slender parts, and are often used instead of tongues for edge joints, as in picture 32. They are not quite so good as a tongue, but are used because they are hidden, while a tongue shows at the ends of the boards.

Fished Joints. Sometimes you may want to join two pieces together by their ends, as you joint up your fishing-rod. You know how easily these joints work loose. So they would in large pieces of timber unless they were made with much care. The carpenter makes them as strong as solid pieces, by means of what he calls fished joints. He may abut the ends simply to touch each other, or lap them sloping, which is called *scarfing*, or notch them, which is called *joggling*. But in nearly every case he secures the joint by the aid of pieces of wood or iron bolted along the sides. These cover the joints on both sides, and bolts go right through them and the pieces which they unite. The effect is just as though you mended a broken stick by laying strips on each side, and bound them tightly with string. There are at least twenty different ways in which these joints are varied in shape, but all have a family resemblance to the illustrations. Picture 33 is a plain lap ; 34 is a lap with covering plates or *fish* plates ; 35 is a scarfed and keyed joint, and 36 a fished and joggled joint.

LITTLE PROBLEMS FOR CLEVER PEOPLE

THESE problems are continued from page 1349, and the answers below refer to the problems on that page.

WHAT IS THE QUESTION?

70 "There is one question to which you must always answer 'Yes' if your answer is correct," said Harold.

What is the question?

WHAT DID THE HANDKERCHIEFS COST?

71 A draper sold ladies' handkerchiefs at 9 cts. each or three for 24 cts. One day he saw his assistant sell a lady one handkerchief, and he said, "Why did you not sell the lady three handkerchiefs?" "Because," said the assistant, "you have the same profit on one as you have on three."

What did the handkerchiefs cost the draper?

HOW MUCH LUGGAGE ALLOWED?

72 "I shall have to pay 6s. 3d. on excess luggage," said Brown, waiting for the train with his friend Smith. "Let me take some of it for you," said Smith, and he took 120 lb. of it. Smith was charged 10d. excess, and Brown for his share paid 1s. 3d. excess.

How much luggage was allowed free, and what was the total weight of luggage?

HOW MUCH COAL DID BLACK BUY?

73 Said Mr. Black: "By ordering coal direct from the pit, I get 21 cwt. for a ton, and on my last order, when coal was $6.00 a ton, I saved $3.60."

How much coal did he buy?

HOW MANY PASSENGERS?

74 "I will take you for 25 cts. each," said the boatman at the ferry. "Will you take two more and make it 20 cts. each?" asked a passenger. "Yes," answered the boatman; "I shall make 10 cts. more if I do."

How many passengers were taken altogether?

WHAT TIME WAS IT?

75 The clock on the church tower takes the same time to make three strokes as the town-hall clock takes to make two strokes. "As I came home," said Jones, "they began to strike the hour at the same instant, and the last stroke of the church clock came exactly at the last stroke but two of the town clock."

What time was it?

THE ANSWERS TO THE PROBLEMS ON PAGE 1349

64 Three dozen pens and five dozen knives would be the same price as 13 dozen pens, seeing that the knives were double the price of the pens. Three dozen knives and five dozen pens would be the same price as 11 dozen pens. The difference in price between 13 dozen pens and 11 dozen pens was $2.88, so two dozen pens cost $2.88, or one pen cost 12c. and 1 knife cost 24c., or twice the price of a pen. The work may be proved. Three doz. pens at $1.44 a doz. and 5 doz. at $2.88 a doz. come to $18.72; 3 doz. knives at $2.88 and 5 doz. pens at $1.44 would have cost $15.84, and the difference is $2.88.

65 The express train takes one hour to travel 40 miles, and the excursion train takes one hour and 20 minutes to travel 40 miles. By the express train the fare is ¼d. per mile more, or 10d. for 40 miles, and the saving in time is 20 minutes. The traveller finds that the saving in time is just equal to the extra charge, so that his time is worth 10d. for each 20 minutes, or 2s. 6d. per hour.

66 The word "united," which is "untied" with the two middle letters changed.

67 Harry began at the end and found that 3 is the only figure which when multiplied into 215 gives 4 in the second figure, so that the third figure in the quotient was 3. As the first figure in the quotient is 1, the line below the dividend is 215. The sum stands:

$$\begin{array}{r} 215)\times 7\times 95(1\times 3 \\ 2\,1\,5 \\ \hline \times 5\times 9 \\ \times 5\times 5 \\ \hline 6\,4\,5 \\ 6\,4\,5 \\ \hline \end{array}$$

The first figure in the dividend must be a 3, because when 2 is subtracted from it something remains. This gives the first remainder as 15×9. Obviously the middle figure in the quotient must be 7, and the second multiple in the sum must therefore be 1505. The figure below the 0 is 6, so that the figure above it must also be 6, and the middle figure in the dividend must be 1. Thus the entire sum is now like this:

$$\begin{array}{r} 215)37195(173 \\ 215 \\ \hline 1569 \\ 1505 \\ \hline 645 \\ 645 \\ \hline \end{array}$$

68 Hicks walked for nine days, and as he walked 117 miles altogether his average was 13 miles. As his increase was regular each day, he must have walked the exact average on the middle day—namely, the fifth day. Thus on the 6th, 7th, 8th, and 9th days he must have walked 14, 15, 16, and 17 miles, and on the 4th, 3rd, 2nd, and 1st days he must have walked 12, 11, 10, and 9 miles. By adding these figures together we get 117 miles, which shows that the answer is correct.

69 One-quarter added to one-third is seven-twelfths, and the difference between seven-twelfths and half, which is six-twelfths, is one-twelfth of the whole. But Fred said that this difference was ten marbles, so that the total number of marbles must have been 120, or twelve times ten marbles. We can prove the answer by adding one-quarter and one-third, which make 70, and this number is ten more than half the number of marbles.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 1607

BIRDS THAT SERVE US

CONTINUED FROM 1430

SEEING that men have tamed horses and cattle, elephants, camels, and many other wild animals for our service, it is not wonderful that they should have tamed birds also, to live about our homes. Fowls and ducks and geese are so common that any farmyard would seem strange without them. Yet they come from birds which once were as wild as the eagle.

Except for one or two varieties of fowls, the Brahmas and Cochins for example, we can point to the wild birds of the woods and jungles of India, Ceylon, and elsewhere and say: "These wild birds are descended from exactly the same families of birds from which our tame fowls came."

We can trace the parentage of ducks and geese in the same way, and that of the majestic swan, which remains still like the beautiful wild creatures from which it descended. Pheasants and partridges, which are now reared by hand, become wild when they grow up; and many other birds which help to feed us, though they owe their power to live to the efforts of man to preserve them, are as wild as the wildest birds that haunt the jungles of India and Africa. There are dozens of breeds of fowls, and the number keeps on growing. Anybody with skill and patience can create new varieties. We could take the biggest fowls, the Cochins or the Malays, and get a race of tiny bantams from them. The smallest eggs of the big birds are taken for hatching, and the smallest eggs from the hens from that brood are kept. Always the smallest birds and their smallest eggs are kept, so that in time the size of the great bird dwindles down to the tiny bantam, which may become like the Japanese midgets, weighing no more than a pound each.

The size and habits of a bird can be changed by methods of selection. Birds which lay many eggs may be mated with birds of great size. The result will be a breed of fowls which grow large and lay many eggs. Birds may be wanted chiefly for the amount of flesh they have. That class of fowls can be obtained in the same way. Then there are birds wanted only for their eggs. Those are taken which lay most and are readiest to leave the hatching of the eggs to other birds. Quite new varieties can be obtained in this way.

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The Romans first brought fowls to Great Britain, whence they came to this country; but the fowls have been so long tamed, they would soon run wild if neglected. It often happens that a hen will stray away from the others and lay her eggs secretly in a rough nest of her own making in the hay-mow. She returns day after day until the nest is full of eggs. Then she will sit on them for three weeks until the chickens hatch, and return in triumph with her little ones to the farmyard.

THE BEST CHICKENS ARE THOSE RAISED BY THE MOTHER BIRD IN SECRET

It is a curious thing that, much as we know about poultry-raising, we cannot by the best-known means get healthier chicks than those which the mother bird herself hatches in secret. But many eggs are hatched without the help of the birds. They are put into a case called an incubator. This is kept warm day and night, and the mere heat of the incubator causes the eggs to hatch; thus little chickens come into the world and grow up and lay eggs without ever having known or seen their parents.

The habits and food of all are practically the same. Early in the morning they like a feed of warm barley-meal. During the day they eat corn, greenstuff, insects and worms, and much grit. The grit is necessary to enable them to grind up the hard corn which they eat, for, of course, they have to bolt their food, as they have no teeth. Their flesh is one of the most valuable forms of food we have, but their eggs are even more important. Eggs are required not only to be eaten as food, but to help in making scores of other things that we eat, including many preserved preparations, candies, and so on; and also for various other purposes, as chemistry and mechanics; so that millions are consumed daily, and eggs become important in commerce.

THE SAVAGE INSTINCT IN FOWLS AND THE CRUEL INSTINCT IN MEN

Some fowls are very savage, Malays and game fowls especially. The game birds used to be bred in great numbers in this country and kept solely for fighting. Rich men had cockpits built at their houses, and there were public dens for cock-fighting. Men would match their birds against other men's birds, and then they would wager large sums on the result. The birds would fight to the death. It was a shamefully cruel sport, and happily it is now forbidden by law. Even to-day, however, it is secretly practised in the South and West, in some parts of which it is rare to find any but game birds in the poultry runs of the miners and other people in humble circumstances.

The fighting instinct in fowls is very strong. They fight fiercely if strange fowls are put into their runs. A hen with chickens will peck strange chickens to death; and chickens, if little ones like themselves are put in with them, will do their best to kill the strangers. Instinct tells them that if strangers come into their home, the strangers are robbers who must be driven away.

There does not seem much resemblance between the common fowl of the farmyard and the most magnificent of birds, the golden pheasant; but fowls, pheasants, grouse, guinea-fowls, partridges, quails and turkeys all belong to the same order. Still, there is no fear of our mistaking, say, a pheasant for a fowl.

THE FAMILY OF THE PHEASANTS, WHICH HAVE BEEN IN ENGLAND 1,000 YEARS

The pheasants are the handsomest wild birds we have of that type. The male bird is a beauty, with a splendid tail eighteen inches long, with a sheeny neck, and head of brown and green edged with yellow and a shimmer of green, blue, and deep orange. The female is not so gaily dressed, nor has she so long a tail. It is as well for her that she is of different appearance from her husband. When men seek the birds, the male pheasant, with his gorgeous feathers, has at once to fly, and so may be shot. The more soberly feathered hen sits close in the undergrowth, and matches so well with it that often she escapes notice. Should her mate be killed, she will join the family of another male, each of which has several wives.

The ordinary pheasants have been domesticated in England and in the neighbouring parts of the continent of Europe for more than a thousand years; and in addition several other sorts are kept here and there as park ornaments. All of these pheasants may be seen in zoological gardens and on some

large country estates in the United States, for they live well in the American climate; and in some places, especially in Oregon and Washington, the Mongolian pheasant has been set free, and is now abundant as a wild bird.

Some naturalists believe the phœnix, which the ancients thought visited Egypt only once every 500 years, was really a golden pheasant. It was supposed that the phœnix burnt itself on an altar, and that a young phœnix arose from the ashes of the old one. What makes people think that the phœnix was really the golden pheasant is the description of it as "the golden-haired bird." The golden pheasant's feathers do look like golden hair. The bird is a glowing mass of gold and crimson. If such a bird were seldom seen, it is quite possible that the ancients would believe it to be the golden-haired bird of their legend.

The golden pheasant has a rival for beauty in the silver pheasant, but it is more gentle than the latter. The silver pheasant, which thrives when brought here, proves quite the fiercest of the pheasant family, and though it is smaller than the strong common pheasant of England, it will drive away all other pheasants but its own family. We might expect the blood pheasants of Western China to be the best fighters of the family, for they have no fewer than four pairs of spurs on their coral-red legs; but the silver pheasant can master them all.

The cock that crows in the morn is busy all day long finding food for the hens and chicks. He is always ready to fight.

The number of varieties in pheasants is surprising. There is one called the tragopan, which is a scarlet beauty, with fleshy horns, above the eyes. Then there is a little family of pheasants called the monals, which are gorgeously coloured and have a crest of plumes on the head. The two kinds last named live in the mountain forests of Asia. Two sorts of fire-backed pheasants have backs covered with fiery bronze-red, while their hens are black, with a gloss of purple and steel-blue. In Central and Eastern Asia we have eared pheasants, so called from the fact that the covers of the ears grow out into long white tufts of feathers. The tails of these birds are long and like a drooping fan, and resemble in texture the tail of the peacock. Strangest of all, perhaps, is the Amherst pheasant, a near relative of the golden pheasant, which has a sort of cape of feathers reaching from its beak right down to the root of its neck. It has an extraordinarily long tail, which sweeps like a feathery snake after it. The habits of all the pheasants are much alike, no matter where they live. Those in England lay many eggs in rough nests on the ground. Keepers collect them and put the eggs under common hens, which hatch them. The baby pheasants grow up like chickens, and are fed by their keepers till they are able to fly away from the coops into the woods, there to mate, to roost in the trees at night, and to go in the day to the keeper when they hear his call with their food. In the end, if their owner is a cruel, lazy sportsman, too idle to hunt his game, they are driven by dogs to what is called a battue. They have to fly over places where many men lie concealed with guns, and after all their careful rearing and feeding they are mercilessly shot down, so that men may boast of the numbers they have killed.

Now we must pass to the grouse, which include the grouse proper, the capercailzie, the blackcock, the ptarmigan, the ruffled and Canada grouse, the quails and the partridges. The grouse common in England and Scotland is the red grouse, really a ptarmigan. It is mainly reddish-brown, with lighter colours and black and white intermixed. The birds nest among the heather, and eat young shoots of heather and other growths, seeds, and so forth.

THE BEAUTIFUL FAMILY OF PHEASANTS

There are five species of eared pheasants. Long tufts of white feathers grow up from the ears, and so give them their name. They have loose, hairy plumage.

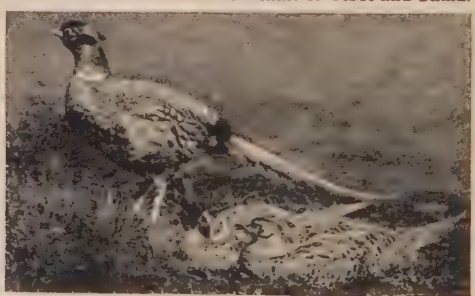
The tragopan, or horned pheasant, is another beautiful bird. When courting, it dances and bows, and struts and shakes the fleshy horns which are over its eyes.

The golden pheasant is not a big bird, but he is the most beautiful of all his family. It is supposed that the bird called by the ancients the phœnix was really a golden pheasant. These splendid birds can live in our climate.

The silver pheasant looks like feathered moonlight. He is a beauty, but too savage to live with common pheasants. He can master all the other varieties.

The Amherst pheasant has a cape of feathers covering the back of the head and the neck, and a very long tail. Its home is in the mountains of Tibet and China.

The peacock pheasant is a bird of rainbow colours with a tail covered with eye-like spots. It lives in the bamboo jungles and the wooded ravines of India and Burmah.



The ordinary British pheasant is one of their most splendid native birds. Its eggs are often hatched by poultry; and the pheasants are tame till they grow up.

BIRDS THAT ARE CRUELLY SHOT FOR SPORT

Quails were numerous in Egypt in the time of the Israelites. They still are so, and during their yearly migrations descend in swarms to cover the land.

The ptarmigan has three different dresses a year. In winter it is as white as the snow, which it loves, but it has dark plumage in summer and grey in autumn.

Partridges are divided into six species. Most of them nest on the ground, but some of them make their homes in trees. Thousands are cruelly shot every year.

Of the thirty species of grouse, the red grouse is the true British bird, and is found nowhere but there. It changes its plumage as the seasons change.

The golden plover is the handsomest of the plover family. It visits England, but wanders also over Russia and Norway, and in winter as far as South Africa.

The ruffed grouse of North America have a frill of feathers on each side of the neck. They make a great drumming sound with their wings in calling their mates.

Black-game is a species of grouse. The male bird is called the black-cock; the female is called the grey-hen. Much of their food consists of buds, leaves, and fruit.

They are protected by law, and most of them are looked after in the nesting season by the gamekeepers on great estates in order that when autumn comes the owners or renters of the estates may go out and shoot them. Grouse-shooting time is a season of great merriment among the rich country-people of Scotland, when all their friends are invited to join in the shooting in the morning, and in the house-parties in the evening.

AMERICAN GROUSE AND PTARMIGAN ARE MORE NUMEROUS AND FREE

It was said that the Scotch red grouse or moor-fowl is a ptarmigan. Other ptarmigan abound in Northern Canada and in the high Rockies, where they form the principal prey of foxes, falcons, and other predatory animals, and one of the chief food-resources of the people of the cold north. They differ from the regular grouse mainly in having the winter coat white, and in having feathers on their feet to keep their toes warm in the snow.

America is rich in grouse, the finest of which is the ruffled grouse, so called because of the long feathers on the neck of the cock. In spite of the fact that it has been shot at steadily ever since the country began to be settled, it still persists in every piece of woods, its brown plumage enabling it to hide easily among the dead leaves. It lies perfectly still, trusting not to be seen until you almost step on it, then springs up with a tremendous noise of whirring wings, and spins out of sight as if it were a sort of bomb fired from a gun. It takes a cool and quick man to hit it under these startling circumstances. Frequently when one is rambling quietly in woody places, especially in the cool, quiet October days, one hears a dull roar which sounds like muffled drumming; and if one is careful, or lucky, or both one may see a cock of the ruffled grouse standing on a dead resounding log, and flapping his wings so rapidly that they make only a blurr of light. He is the drummer; and it is a really wonderful performance.

Very similar is the western grouse, known to all gunners as prairie chickens, only they live on the prairies and not in forests. In the northern United States and Canada are several other handsome grouse, which spend most of their time in trees, feeding on spruce buds, etc.; but all the grouse make their nests on the ground.

The biggest of all the grouse is the capercailzie, the males, when fully grown, being almost the size of a turkey. Like the ptarmigan, its legs and feet are feathered. Its habits are like those of the pheasant and grouse.

HOW THE MALE BIRDS STALK AND PRANCE ABOUT TO ATTRACT ATTENTION

All the male birds we have been reading of have finer feathers than the females. The reason is that the hens love the males which have the handsomest appearance. The males spread their tails, and stalk and prance in the most comical way to attract the attention of the female birds whose admiration they wish to win. The black-cock calls his lady friends with a noise like the sharpening of a scythe. The grouse so rapidly beats the air with his wings that the noise is called drumming. The capercailzie woos his love by the aid of his voice, and fights savagely with other male birds who dispute his choice.

The partridge is the most plentiful of game birds in this country. It is well for it that it multiplies so rapidly, for sportsmen shoot it in swarms every shooting season. It is a bird that we are bound to admire for the love which it shows for its little ones, and the skill with which it draws away their enemies. The nest lies in the grass or undergrowth; and, suppose a dog approaches, out flutters the mother partridge, just in front of the dog's nose. She flutters slowly, just ahead of him, as if she had a broken wing. The dog follows her, thinking that he is going to make an easy catch. But she keeps always a little ahead until she has drawn him far enough away from her babies. Then she rises and sails away like the wind.

In this trick the partridge has a close imitator in the plover, a bird which is to be found everywhere. Our most common variety is the golden plover, a handsome bird, which makes a nest on the ground, and, when the little ones are hatched, makes the most frantic efforts to save them from an enemy. The birds will fly round and round the head of a man whom they fear, and he quite expects them to peck at his eyes. They will drop to the ground and run. Anything which can draw him away from the nest these clever, loving birds do.

A GROUP OF TURKEYS, DUCKS, AND GEESE

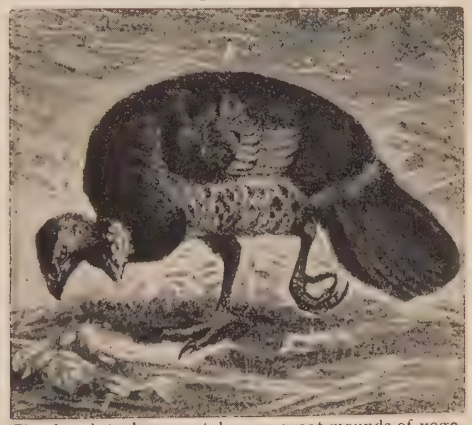
European turkeys came from Mexico, but have long been tamed. The wild turkeys fly well, and swim any river which they want to cross when tired.

The barnacle-goose was believed by old-time sailors to be hatched from barnacles, so they gave it the name by which it is still called. It avoids men very cleverly.

Eider-ducks line their nests with beautiful white down plucked from their own bodies. This is collected to make bedding for men and women.

Crested and common guinea-fowls are found in Africa, where they are numerous. They thrive here, and are valued as food, but a guinea-fowl is a noisy nuisance.

The sheldrake loves sandy places near the sea. Here it finds holes made by rabbits, and in these it lays its eggs. It is called, therefore, the burrow-duck.



The brush-turkey scratches up great mounds of vegetation, and in these places its eggs. The heat of the vegetation hatches them without trouble to the bird.

The photographs on these pages are by Charles and William Reid, Lewis Medland, W. P. Dando, and others.

The smallest of the partridges is the quail. These birds are strange little things, looking at a distance like fat, diminutive grouse. But they are great fliers, and men, knowing how they fly across Europe during the spring, catch them by scores of thousands in nets. Our American bobwhite, which we call quail, is a very similar bird, but larger, and it is not migratory. They multiply rapidly, and in Egypt they still, as in the days of Moses, appear in such flocks at night as to almost cover the land.

How the Turkey Builds a Mound and Digs a Pit to Lay Her Eggs

Everybody knows what the turkey is like, because so many are reared in this country. Many fine birds are raised in England also. The birds of Norfolk are black; those of Cambridge are more of a bronze colour, and in that resemble the wild birds of Mexico and North America, from which all our tame turkeys have descended. Turkeys, when in captivity, do not show much desire to fly, but the wild ones do. They fly with great force while they are at it, but come down suddenly when tired. When they find a broad river in the way, many of them, falling weary, drop into the water and swim.

The most curious turkey is the brush-turkey, or talegalla, which is one of a family called mound-birds. It has very long claws, and uses these to build great mounds of decayed vegetable matter. It scratches up all it can find, grasping the substance with its claws and throwing it backwards towards a point behind. Sometimes these mounds reach the size of several cartloads of rubbish. This mass of matter gradually becomes very hot. Then the mother bird digs holes in it, and in each hole lays an egg. The heat hatches the egg, and all that the hen has to do is to wait and see that the chicks are all right when hatched. The funny thing is that the little ones, as soon as they are born, can dry their wings like a moth and fly for safety to the nearest tree. If they could not do this, they would be gobbled up by animals.

The Guinea-fowls that Gabble, Gabble, Gabble at Night, & the Ducks

When we hear a number of birds making a great gabble, gabble, gabble all night, we may be sure that we are in the neighbourhood of guinea-fowls. The bird was first discovered in Eastern Africa, and from there it has been taken and tamed in many parts of the world. It runs wild very soon, but when looked after is as tame as ordinary poultry.

Of ducks, to which we must now pass, there are a great many varieties. All the tame ones are descended from the common wild duck, or mallard. To see these handsome creatures flying swiftly through the air, one would never think that the great white Aylesbury duck is a member of their family.

Ducks are of two classes—sea-ducks and river-ducks, rarely found together. The sea-ducks as a rule are larger, and some of them, as the mergansers or saw bills, feed on fish and are not good to eat. Most of the salt as well as the fresh water ducks eat plant food, however. This is especially true of the American river-ducks; and it is because they are so fond of the ripe wild celery of our marshes that our canvas-backs, red-heads, teals and others brought to market in the autumn are world-famous delicacies.

Ducks are Great Travellers, but Find their Journeys Full of Danger

Most of the ducks of North America and of Europe are migratory, flying every spring from the tropical countries where they have spent the winter to the far north, where they are accustomed to make their houses and rear their young. They begin to come in February, small flocks appearing along the coast or ascending the valleys of rivers, such as the Mississippi, the Hudson, or the Danube, travelling at night and dropping down into the coast marshes or river shallows in the early morning to feed. This is the time when sportsmen seek to shoot them, building little shelters of earth and reeds in the marshes, where they will not be noticed until the birds are close at hand or lying hidden in low skiffs, which they properly call sneak-boats. The gunners play a further trick of setting afloat near their "blinds" a flock of carefully-painted wooden ducks called "decoys." The wild travellers, seeing their fellows (as they believe) peacefully at rest in a pool, think it safe to drop down beside them, then discover their error too late.

The Mallard and several other of the North American ducks stay in our inland marshes all the summer.

BIRDS THAT LIVE ON INLAND WATERS

Astronomers prophesy that new stars will be discovered, and the new stars do appear. Poets dreamed and sang of black swans, and were laughed at. But when Australia was explored, lo! black swans were there. The bird is heavy and prefers swimming, but when it has to change its quarters it flies with great power.

There are scores of species of geese. Those which we see about the farmyard ponds descend from the grey lag-goose. The common geese do not fly, but the wild ones do, far and fast. In quiet places the wild ones feed by day, but when in danger they become purely night-birds, and lie silent and in hiding while the sun is up.

Swans are the most majestic of our inland water-birds. They swim with grace, and they fly with strength and skill. The wild ones come inland for the summer to hatch their young, but then they fly away and no man can follow them, as day and night they wing their way to their distant winter quarters. Their call-note is very loud.

Although its flesh is not much good for food, the eider-duck is one of the most valuable birds. It is a big bird, living in cold climates. The ducks assemble in enormous numbers at their breeding-places, and the mother bird strips her breast of the beautiful down to make the nest warm for her little ones. Men collect this down to make into pillows, quilts, and many other things. If her nest be robbed, the mother bird will again pluck down from herself, and the male bird will add his stock, though this is not so fine as the female's. Each nest yields about a quarter of a pound of the finest down, which helps to keep us warm in our beds on winter nights.

The eider-duck is a sort of goose, but not of the kind which we know in this country. Barnyard geese come from the European grey lag, a strong flying bird, which migrates from place to place. Most of the wild geese which come to this country are visitors from colder climates. They are all splendid fliers; and the skill with which the barnacle-goose avoids men shows that the bird is not nearly so silly as we all pretend to think it. The name which this bird bears is the result of one of men's silly mistakes. They thought that this goose grew out of the common barnacle-shell, so they called it the barnacle-goose.

The cormorant is the only bird that catches fish for men. It is trained to do this in China, and is also used for this purpose in Japan.

The most aristocratic member of the family to which the ducks and geese belong is the swan, the most majestic bird that sails the waters. The big park swans are white, but here and there we see black swans, brought from Australia, the land of so many strange animals and birds. For ages poets dreamed of black swans, but nobody believed that there could be such a thing until these birds were found in Australia. The general features of swans do not much vary. We have the white swan, the black swan, and the white swan with a black neck, each a distinct species, yet not greatly differing in form. Some of them are supposed to have no voice, others whistle, while others have a voice like a trumpet.

We ought all to be thankful that it is a crime to kill swans without legal right. They are so beautiful, and do such little harm, that nobody could wish to hurt them except those wretched people who never see a bird without wanting to kill it. Big as they are, swans fly with great power. This accounts for their suddenly appearing where no swans were ever seen before.

A pair of swans dropped down from the skies one day into the horse-pond at a lovely little village in Hertfordshire. The pond is at the side of the main road, over which carts and motors in hundreds pass every day. But there the swans stayed, as if they had always lived there. They built a great nest, and the mother bird laid her eggs and hatched the little ones. Then, when these had grown up, without any warning the birds flew away, and have never been seen there since.

Nobody knows whence they came, nor whither they went. The curious thing is that there are swans in a narrow stream not very far away from this pond. But the strangers never called on the stream swans, and the stream swans never paid a visit to the pond.

All these are among the birds which serve us as food or clothing, even the swan being eaten, and its soft feathers used for the purposes for which swans-down is famous. But there is one bird which serves man by hunting for him. This is the cormorant, a curious bird with a neck as supple as a swan's, but with a wonderful beak. The Chinese train this bird to fish for them. They take two or three of the birds out on a raft into a river, and the birds, the moment they see a fish, plunge in and catch it.

When they are being trained, the comorants have a ring fastened round their necks so that they cannot swallow the fish, which they give to their masters. Then they have a good feed themselves. When thoroughly trained, they do not need a ring on their necks, but take the fish to their masters freely.

The next stories of Birds are on page 1625.

THE BABES IN THE WOOD

CONTINUED FROM 1440

ONCE upon a time two children lived in a big house on the borders of a wood. Their parents, who loved them very dearly, were rich enough to buy them all the lovely things they longed for, and all day long they played in a beautiful garden, learning the songs of the birds and the secrets of the flowers. But one sad day their father and mother left them for a happier home in the skies, and the sister and brother were left alone.

The boy did his best to comfort his little sister; but they were sad days, and, though they did not know it then, days that were sadder still were soon to come.

The children had an uncle whom they had never seen. He lived far away across the seas; but as soon as he learned of the death of his brother, the children's father, he hurried to their home. He knew that now their father was dead the children would have all his money, and the uncle also knew that if he could get rid of the children all this money would be his.

And the more he thought about this money the more he longed for it. And then a dreadful thought came into his head. He determined to kill the little innocent children and take their money.

So he hired two robbers, and paid them to take the children to a lonely spot in the wood and there kill them.

One morning, when the sun shone brightly and all the birds were gay, the robbers crept into the garden where the children were playing and took them away. The robbers were big, rough men, and the children were afraid; but they were told that their uncle had sent them, and they dared not disobey. The men led them out of the garden into the wood, and on and on till they came to a deserted spot. They had come a long way, and the children were glad to rest. They sat down on the trunk of a tree while the robbers moved away and carried on a conversation in a low voice.

But presently they began to quarrel; their voices became loud and angry, and the children heard words that made them tremble with fear.

"I've been paid to kill them, and I shall earn my money," one of them was saying, over and over again.

But the other robber seemed more kindly.

"Why kill them?" he said. "Let us lose them, and perhaps someone may find them and give them shelter."

The little girl crept closer to her brother.

"They want to kill us," she said, in a terrified whisper.

But before the boy could answer the kindly robber came forward and spoke to them.

"Stay here while we go to find food and shelter for the night," he said in a gruff voice.

Then they went away, and the children were left all alone in the wood.

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TOO WEARY TO GO ANY FARTHER, THE CHILDREN SAT DOWN UNDER A FRIENDLY OAK

They dare not return to their wicked uncle, and they had no other home; so they wandered on, hand in hand, hoping to find shelter.

The forest was very beautiful, and for a time they were happy among the wild flowers and ferns; but soon the sun went down, the birds hushed their songs, and a great stillness came over all. Still the children toiled bravely on, tired, and hungry, and sad.

Presently the trees grew so thickly together that they could scarcely find their way, and at last the darkness of night came on and hid even the trees from sight. Too weary and frightened to go any farther, the children sat down under a friendly oak, and fell asleep in one another's arms.

The birds of the forest peeped down from their nests above; the shy squirrels with their long tails glanced wonderingly at them, and the gentle wind shook the leaves so that they fell, making a cloak of crimson and gold to cover them.

And when morning came a beautiful angel flew down and carried them away to their father and mother in the glorious world above.

THE HUNGRY FOX AND THE KITTEN

A VERY hungry fox was prowling one moonlit night about a farmhouse, and he met a little kitten.

"You're not much of a meal for a starving creature," he said. "But in these hard times something is always better than nothing."

"Oh, don't eat me!" said the kitten. "I know where the farmer keeps his cheeses. Come with me and see."

She led him into the farmyard, where there was a deep well with two buckets.

"Now, look in here, and you will see the cheeses," she said.

The fox peered down the well, and saw the moon reflected in the water.

"This is the way down," said the kitten, jumping into the top bucket. Round and round rattled the rope-wheel, and down went the kitten into the water. Happily, she had gone down before, and she knew what to do, and, getting out of the bucket, she clung on to the rope just above the water.

"Can't you bring up one of the cheeses?" said the fox.

"No, they are too heavy," said the kitten. "You must come down."

Now, the two buckets were connected, so that when one went down the other came up. As the fox was much heavier than his little companion, his bucket went down and the water drowned him, while the kitten came up and escaped.

THE PROUD KING OF KAMERA

THE negro King of Kamera, in Africa, was a proud, stern man, and his men feared him, and instantly carried out his slightest wishes. But one day, when he was boasting that all men were his servants, a wise old negro, called Boukabar, reproached him, saying:

"All men are servants of one another."

"So I am your servant, am I?" said the king, in great anger. "Then prove it. Force me to work for you before sunset, and I will give you a hundred cows. Fail, and I will kill you, and so show you that I am your master."

"Very well," said Boukabar.

Being a very old man, he had to use a stick in walking, and just as he took it up to go out, a beggar came to the door.

"Permit me," said Boukabar, "to give this poor man something to eat."

Taking some food in both hands, he tottered past the king, and his stick slipped from under his arm and got entangled in his dress, and nearly tripped him up. And he cried to the king:

"Please pick up the stick, or I shall fall." The king picked it up without thinking, and Boukabar then laughed merrily, and exclaimed: "You see, all good men are servants of one another. I am waiting on the beggar, and you are waiting on me. But I do not want the cows. Give them to this poor man."

The king did so, and took Boukabar as his chief counsellor, and Boukabar showed him how to rule his people well.

LOVE LAUGHS AT LOCKSMITHS

THIS was the device which the handsome young Marquis of Hautmont engraved on his shield when he came to Paris. Being as bold as he was handsome, he began to make love to Princess Marguerite, the king's daughter, and the king was annoyed at his boldness.

"They are loud words which you have taken for your device," said he, "but are they true? I will lock the princess up in a tower. If you can enter it within a month, you can marry her. If you fail, you must lose your life."

The marquis pretended to be discomfited. But he secretly ordered some woodcarvers to make a great hollow wooden nightingale. When the bird was finished and painted, the marquis got inside and played beautiful airs on a flute, while his servant drew it about the streets. Everybody began to talk about the mechanical nightingale; the king came to see it, and Princess Marguerite asked for it to be brought to her. The king, thinking that the music was produced by machinery, had the bird carried into the tower, and the marquis then jumped out and kissed the princess's hand, saying:

"Love laughs at locksmiths, you see, sire." And the king was forced to acknowledge that this was true; and as he saw that the marquis and the princess were in love with one another, he allowed them to marry, and presented them with a really royal dowry.

THE KING OF THE GOLDEN RIVER

This is the second chapter of the fairy story by John Ruskin, which began on page 1433

SOUTH-WEST WIND LEAVES THE VALLEY

South-West Wind, Esquire, was as good as his word. He entered the Treasure Valley no more; and, what was worse, he had so much influence with his relations, the West Winds in general, and used it so effectually, that they all adopted a similar line of conduct.

So no rain fell in the valley from one year's end to another. Though everything remained green and flourishing in the plains below, the inheritance of the three brothers was a desert. All their money was gone, and they had nothing left but some curious old-fashioned pieces of gold plate.

"Suppose we turn goldsmiths?" said Schwartz to Hans. "It is a good knave's trade. We can put a great deal of copper into the gold without anyone's finding it out."

The thought was agreed to be a very good one; they hired a furnace, and turned goldsmiths. But two slight circumstances affected their trade—the first, that people did not approve of the coppered gold; the second, that the two elder brothers, whenever they had sold anything, used to leave little Gluck to mind the furnace, and go and drink out the money in the ale-house next door.

So they melted all their gold without making money enough to buy more, and were at last reduced to one large drinking-mug, which an uncle of his had given to little Gluck, and which he was very fond of, and would not have parted with for the world, though he never drank anything out of it but milk-and-water. The mug was a very odd mug to look at. The handle was formed of two wreaths of flowing golden hair, so finely spun that it looked more like silk than metal; and these wreaths descended into, and mixed with, a beard and whiskers of the same exquisite workmanship, which surrounded and decorated a very fierce little face, of the reddest gold imaginable, right in the front of the mug, with a pair of eyes in it which seemed to command its whole circumference. When it came to the mug's turn to be made into spoons, it half broke poor little Gluck's heart; but the brothers only laughed at him, tossed the mug into the melting-pot, and staggered out to the ale-house, leaving him to pour the gold into bars when it was all ready.

When they were gone, Gluck took a farewell look at his old friend in the melting-pot. He sauntered to the window, and saw the rocks of the mountain-tops all crimson and purple with the sunset; and the river, brighter than all, fell, in a waving column of pure gold, from precipice to precipice, with the double arch of a broad purple rainbow stretched across it.

"Ah," said Gluck aloud, after he had looked at it for a while, "if that river were really all gold, what a nice thing it would be!"

"No, it wouldn't, Gluck," said a clear voice, close at his ear.

"Bless me, what's that?" exclaimed Gluck, jumping up.

There was nobody there.

He looked into all the corners and cupboards, and then began turning round and round as fast as he could in the middle of the room, thinking there was somebody behind him,

when the same voice struck again on his ear.

It was singing now very merrily, "Lala-lira-la"; no words, only a soft melody, like a kettle on the boil. All at once it struck Gluck that it sounded louder near the furnace. He ran to the opening, and looked in. Yes, he saw right; it seemed to be coming, not only out of the furnace, but out of the pot. He uncovered it, and ran back in a great fright, for the pot was certainly singing! He stood in the farthest corner of the room, with his hands up and his mouth open, for a minute or two, when the singing stopped, and the voice became clear.

"Hallo!" said the voice.

Gluck made no answer.

"Hallo! Gluck, my boy," said the pot again.

Gluck summoned all his energies, walked straight up to the crucible, drew it out of the furnace, and looked in. The gold was all melted, and its surface as smooth and polished as a river; but instead of reflecting little Gluck's head as he looked in, he saw, meeting his glance from beneath the gold, the red nose and sharp eyes of his old friend the mug, a thousand times redder and sharper than ever he had seen them in his life.

"Come, Gluck, my boy," said the voice out of the pot again, "I'm all right; pour me out."

But Gluck was too much astonished to do anything of the kind.

"Pour me out, I say," said the voice rather gruffly.

Still Gluck couldn't move.

"*Will* you pour me out?" said the voice passionately. "I'm too hot."

By a violent effort Gluck recovered the use of his limbs, took hold of the crucible, and sloped it so as to pour out the gold. But instead of a liquid stream, there came out, first, a pair of pretty little yellow legs, then some coat-tails, then a pair of arms, and, finally, the well-known head of his friend the mug; all which articles, uniting as they rolled out, stood up energetically on the floor, in the shape of a little golden dwarf, about a foot and a half high.

"That's right!" said the dwarf, stretching out first his legs, and then his arms, and then shaking his head up and down and as far round as it would go for five minutes without stopping, apparently with the view of ascertaining if he were quite correctly put together, while Gluck stood contemplating him in speechless amazement.

He was dressed in a slashed doublet of spun gold, so fine in its texture that the colours gleamed over it as if on a surface of mother-of-pearl; and over this brilliant doublet his hair and beard fell full half-way to the ground in waving curls.

The dwarf turned his small, sharp eyes full on Gluck, and stared at him deliberately for a minute or two. This gave time for Gluck to collect his thoughts a little, and, seeing no great reason to view his visitor with dread, he ventured on a question.

"Pray, sir," said Gluck, "were you my mug?"

On which the little man turned sharply round, walked straight up to Gluck, and drew himself up to his full height.

"I am the King of what you mortals call the Golden River. The shape you saw me in was owing to the malice of a stronger king, from whose enchantments you have freed me. What I have seen of you and your conduct to your wicked brothers renders me willing to serve you; therefore attend to what I tell you. Whoever shall climb to the top of that mountain from which you see the Golden River issue, and shall cast into the stream at its source three drops of holy water, for him, and for him only, the river shall turn to gold. But no one failing in his first can succeed in a second attempt; and if anyone shall cast unholy water into the river it will overwhelm him, and he will become a black stone."

So saying, the King of the Golden River turned away and deliberately walked into the centre of the hottest flame of the furnace. His figure became red, white, transparent, dazzling, a blaze of intense light—rose, trembled, and disappeared. The King of the Golden River had evaporated.

"Oh!" cried poor Gluck, running to look up the chimney after him. "Oh, dear, dear, dear me! My mug! my mug! my mug!"

CHAPTER III.

THE QUEST OF HANS, AND THE BLACK STONE

The King of the Golden River had hardly made his extraordinary exit before Hans and Schwartz came roaring into the house, very savagely drunk.

The discovery of the total loss of their last piece of plate had the effect of sobering them just enough to enable them to stand over Gluck beating him very steadily for a quarter of an hour; at the expiration of which period they dropped into a couple of chairs, and requested to know what he had got to say for himself. Gluck told them his story, of which, of course, they did not believe a word. They beat him again till their arms were tired, and staggered to bed. In the morning, however, the two brothers, after wrangling a long time on the knotty question which of them should try his fortune first, drew their swords and began fighting. The noise of the fray alarmed the neighbours, who sent for the constable.

Hans, on hearing this, contrived to escape, and hid himself; but Schwartz was taken before the magistrate, fined for breaking the peace, and, having drunk out his last penny the evening before, was thrown into prison till he should pay.

When Hans heard this he was much delighted, and determined to set out immediately for the Golden River. How to get the holy water was the question. He went to the priest, but the priest could not give any holy water to so abandoned a character. So Hans stole a cupful, and returned home in triumph.

Next morning he got up before the sun rose, put the holy water into a strong flask, and two bottles of wine and some meat in a basket, slung them over his back, took his staff in his hand, and set off for the mountains.

It was, indeed, a morning that might have made anyone happy, even with no Golden River to seek for. Level lines of dewy mist lay stretched along the valley, out of which rose the massy mountains.

The Golden River was now nearly in shadow; all but the uppermost jets of spray, which rose like slow smoke above the undulating line of the cataract, and floated away in feeble wreaths upon the morning wind.

On this object, and on this alone, Hans' eyes and thoughts were fixed; forgetting the distance he had to traverse, he set off at an imprudent rate of walking, which greatly exhausted him before he had scaled the first range of the green and low hills. He was, moreover, surprised, on surmounting them, to find that a large glacier, of whose existence he had been absolutely ignorant, lay between him and the source of the Golden River.

He entered on it with the boldness of a practised mountaineer; yet he thought he had never traversed so strange or so dangerous a glacier in his life. The ice was excessively slippery, and out of all its chasms came wild sounds of gushing water. The ice crashed and yawned into fresh chasms at his feet, and tottering spires nodded around him and fell thundering across his path; and it was with terror that he leaped the last chasm, and flung himself, exhausted and shuddering, on the firm turf of the mountain.

His way now lay straight up a ridge of bare red rocks, without a blade of grass to ease the foot, or a projecting angle to afford an inch of shade from the south sun. It was past noon, and the rays beat intensely upon the steep path, while the whole atmosphere was motionless and penetrated with heat. Intense thirst was soon added to the bodily fatigue with which Hans was now afflicted; glance after glance he cast on the flask of water which hung at his belt.

"Three drops are enough," at last thought he; "I may, at least, cool my lips with it."

He opened the flask, and was raising it to his lips when his eye fell on an object lying on the rock beside him; he thought it moved. It was a small dog, apparently in the last agony of death from thirst. Its tongue was out, its jaws dry, and a swarm of black ants were crawling about its lips and throat. Its eye moved to the bottle which Hans held in his hand. He raised it, drank, spurned the animal with his foot, and passed on. And he did not know how it was, but he thought that a strange shadow had suddenly come across the blue sky.

HANS SAW A GREY-HAIRED OLD MAN EXTENDED ON THE ROCKS. "WATER!" HE CRIED FEEBLY

The path became steeper and more rugged every moment; and the high hill air, instead of refreshing him, seemed to throw him into a fever. The noise of the hill cataracts sounded like mockery in his ears; they were all distant, and his thirst increased every moment.

Another hour passed, and he again looked down to the flask at his side; it was half empty; but there was much more than three drops in it. He stopped to open it, and again, as he did so, something moved in the path above him. It was a fair child, stretched nearly lifeless on the rock, its breast heaving with thirst, its eyes closed, and its lips parched and burning. Hans eyed it deliberately, drank, and passed on. And a dark, grey cloud came over the sun, and long, snake-like shadows crept up along the mountain sides.

Hans struggled on. The sun was sinking, but its descent seemed to bring no coolness; the leaden weight of the dead air pressed upon his brow and heart, but the goal was now near. He saw the cataract of the Golden River springing down from the hillside, scarcely five hundred feet above him. He paused for a moment to breathe, and sprang on to complete his task.

At this instant a faint cry fell on his ear. He turned, and saw a grey-haired old man extended on the rocks. His eyes were sunk, his features deadly pale, and gathered into an expression of despair.

"Water!" He stretched his arms to Hans, and cried feebly: "Water! I am dying!"

"I have none," replied Hans. "Thou hast had thy share of life."

He strode over the prostrate body, and darted on. And a flash of blue lightning rose out of the East, shaped like a sword; it shook thrice over the whole heaven, and left it dark with one heavy, impenetrable shade. The sun was setting; it plunged towards the horizon like a red-hot ball.

The roar of the Golden River rose on Hans' ear. He stood at the brink of the chasm through which it ran. Its waves were filled with the red glory of the sunset; they shook their crests like tongues of fire, and flashes of bloody light gleamed along their foam. Their sound came mightier and mightier on his senses; his brain grew giddy with the prolonged thunder. Shuddering, he drew the flask from his girdle, and hurled it into the centre of the torrent.

As he did so, an icy chill shot through his limbs; he staggered, shrieked, and fell. The waters closed over his cry. And the moaning of the river rose wildly into the night, as it gushed over THE BLACK STONE.

CHAPTER IV.

THE QUEST OF SCHWARTZ AND WHAT BEFELL HIM.

Poor little Gluck waited very anxiously alone in the house for Hans' return. Finding he did not come back, he was terribly frightened, and went and told Schwartz in the prison all that had happened. Schwartz was pleased, and said that Hans must certainly have been turned into a black stone, and he should have all the gold to himself.

But Gluck was very sorry, and cried all night. When he got up in the morning, there was no bread in the house, nor any money; so Gluck went and hired himself to another goldsmith, and he worked so hard, and so neatly, and so long every day, that he soon got money enough together to pay his brother's fine, and he gave it all to Schwartz, and Schwartz got out of prison. Then Schwartz was quite pleased, and said he should have some of the gold of the river. But Gluck only begged he would go and see what had become of Hans.

Now when Schwartz had heard that Hans had stolen the holy water, he thought to himself that such a proceeding might not be considered altogether correct by the King of the Golden River, and determined to manage matters better. So he took some more of Gluck's money, and went to a bad priest, who gave him some holy water very readily for it. Then Schwartz was sure it was all quite right. So Schwartz got up early in the morning before the sun rose, and took some bread and wine in a basket, and put his holy water in a flask, and set off for the mountains.

LITTLE GLUCK, FRIGHTENED, WENT AND TOLD SCHWARTZ IN PRISON ALL THAT HAD HAPPENED

Like his brother, he was much surprised at the sight of the glacier, and had great difficulty in crossing it even after leaving his basket behind him. The day was cloudless, but not bright; there was a heavy purple haze hanging over the sky, and the hills looked lowering and gloomy. And as Schwartz climbed the steep rock path, the thirst came

upon him until he lifted his flask to his lips to drink. Then he saw the fair child lying near him on the rocks, and it cried to him, and moaned for water.

"Water, indeed!" said Schwartz. "I haven't half enough for myself," and passed on. And as he went he thought the sunbeams grew more dim, and he saw a low bank of black cloud rising out of the West; and, when he had climbed for another hour, the thirst overcame him again, and he would have drunk. Then he saw the old man lying before him on the path, and heard him cry out for water.

"Water, indeed!" said Schwartz. "I haven't half enough for myself." And on he went.

Then, again, the light seemed to fade from before his eyes, and he looked up, and, behold, a mist, of the colour of blood, had come over the sun; and the bank of black cloud had risen very high, and its edges were tossing and tumbling like the waves of the angry sea. And they cast long shadows, which flickered over Schwartz's path.

A sudden horror came over Schwartz, he knew not why; but the thirst for gold prevailed over his fear, and he rushed on. And when Schwartz stood by the brink of the Golden River, its waves were black like thunder-clouds, but their foam was like fire; and the roar of the waters below and the thunder above met as he cast the flask into the stream.

And, as he did so, the lightning glared in his eyes, and the earth gave way beneath him, and the waters closed over his cry. And the moaning of the river rose wildly into the night, as it gushed over the

TWO BLACK STONES.

THE PRIEST GIVES GLUCK SOME HOLY WATER

CHAPTER V.

GLUCK REACHES THE GOLDEN RIVER.

When Gluck found that Schwartz did not come back, he was very sorry, and did not know what to do. He had no money, and was obliged to go and hire himself again to the goldsmith, who worked him very hard, and gave him very little money.

So, after a month or two, Gluck grew tired, and made up his mind to go and try his fortune with the Golden River.

"The little king looked very kind," thought he. "I don't think he will turn me into a black stone."

So he went to the priest, and the priest gave him some holy water as soon as he asked for it. Then Gluck took some bread in his basket, and the bottle of water, and set off very early for the mountains.

If the glacier had occasioned a great deal of fatigue to his brothers, it was twenty times worse for him, who was neither so strong nor so practised on the mountains. He had several very bad falls, lost his basket and bread, and was very much frightened at the strange noises under the ice. He lay a long time to rest on the grass after he had got over, and began to climb the hill just in the hottest part of the day. When he had climbed for an hour, he got dreadfully thirsty, and was going to drink like his brothers when he saw an old man coming down the path above him, looking very feeble, and leaning on a staff.

"My son," said the old man, "I am faint with thirst, give me some of that water."

Then Gluck looked at him, and when he saw that he was pale and weary, he

gave him the water; "Only pray don't drink it all!" said Gluck. But the old man drank a great deal, and gave him back the bottle two-thirds empty. Then he bade him good speed, and Gluck went on again merrily. And the path became easier to his feet, and two or three blades of grass appeared upon it, and some grasshoppers began singing on the bank beside it; and Gluck thought he had never heard such merry singing.

Then he went on for another hour, and the thirst increased on him so that he thought he should be forced to drink. But, as he raised the flask, he saw a little child lying panting by the roadside, and it cried out piteously for water. Then Gluck struggled with himself, and determined to bear the thirst a little longer; and he put the bottle to the child's lips, and it drank it all but a few drops.

Then it smiled on him, and got up, and ran down the hill; and Gluck looked after it till it became as small as a little star, and then turned and began climbing again. And then there were all kinds of sweet flowers growing on the rocks, bright green moss, with pale pink starry flowers, and soft belled gentians, more blue than the sky at its deepest, and pure white transparent lilies. And crimson and purple butterflies darted hither and thither, and the sky sent down such a pure light that Gluck had never felt so happy in his life.

Yet, when he had climbed for another hour, his thirst became intolerable again, and when he looked at his bottle he saw that there were only five or six drops left in it, and he could not venture to drink. And, as he was hanging the flask to his belt again, he saw a little dog lying on the rocks gasping for breath—just as Hans had seen it on the day of his ascent. And Gluck stopped and looked at it, and then at the Golden River, not five hundred yards above him; and he thought of the dwarf's words, "that no one could succeed except in his first attempt"; and he tried to pass the dog, but it whined piteously, and Gluck stopped again.

"Poor beastie," said Gluck, "it'll be dead when I come down again if I

GLUCK PUT THE BOTTLE TO THE CHILD'S LIPS AND IT DRANK IT ALL BUT A FEW DROPS

THE DWARF FADES AWAY IN THE MIST

As he spoke, the figure of the dwarf became indistinct The playing colours of his robe formed themselves into a mist of dewy light he stood for an instant veiled with them as with the belt of a broad rainbow. The colours grew faint, the mist rose into the air, the monarch had evaporated Then Gluck cast the three drops into the stream.

don't help it." Then he looked closer and closer at it, and its eye turned on him so mournfully that he could not stand it. "Confound the King and his gold, too!" said Gluck; and he opened his flask, and poured all the water into the dog's mouth.

The dog sprang up and stood on its hind legs. Its tail disappeared; its ears became long, longer, silky golden; its nose became very red; its eyes became very twinkling. In three seconds the dog was gone, and before Gluck stood his old acquaintance the King of the Golden River.

"Thank you," said the monarch; "but don't be frightened, it's all right." For Gluck showed manifest symptoms of consternation at this unlooked-for reply to his last observation. "Why didn't you come before," continued the dwarf, "instead of sending me those rascally brothers of yours for me to have the trouble of turning into stones? Very hard stones they make, too!"

"Oh, dear me!" said Gluck, "have you really been so cruel?"

"Cruel!" said the dwarf. "They poured unholy water into my stream; do you suppose I'm going to allow that?"

"Why," said Gluck, "I am sure, sir—your Majesty, I mean—they got the water out of the church font."

"Very probably," replied the dwarf; "but," and his countenance grew stern as he spoke, "the water which has been refused to the cry of the weary and dying is unholy, though it had been blessed by every saint in heaven; and the water which is found in the vessel of mercy is holy, though it had been defiled with corpses."

So saying, the dwarf stooped and plucked a lily that grew at his feet. On its white leaves there hung three drops of clear dew. And the dwarf shook them into the flask which Gluck held in his hand. "Cast these into the river," he said, "and descend on the other side of the mountains into the Treasure Valley. And so good speed!"

As he spoke, the figure of the dwarf became indistinct. The playing colours of his robe formed themselves into a mist of dewy light: he stood for an instant veiled with them as with the belt of a broad rainbow. The colours grew faint, the mist rose into the air; the monarch had evaporated.

And Gluck climbed to the brink of the Golden River, and its waves were as clear as crystal and as brilliant as the sun. And, when he cast the three drops of dew into the stream, there opened, where they fell, a small circular whirlpool, into which the waters descended with a musical noise.

Gluck stood watching it for some time, very much disappointed, because not only the river was not turned into gold, but its waters seemed much diminished in quantity. Yet he obeyed his friend the dwarf, and descended the other side of the mountains, towards the Treasure Valley; and, as he went, he thought he heard the noise of water working its way under the ground. And, when he came in sight of the Treasure Valley, behold, a river, like the Golden River, was springing from a new cleft of the rocks above it, and was flowing in innumerable streams among the dry heaps of red sand.

And as Gluck gazed, fresh grass sprang beside the new streams, and creeping plants grew, and climbed among the moistening soil. Young flowers opened suddenly along the river sides, as stars leap out when twilight is deepening, and thickets of myrtle and tendrils of vine cast lengthening shadows over the valley as they grew. And thus the Treasure Valley became a garden again, and the inheritance, which had been lost by cruelty, was regained by love.

And Gluck went and dwelt in the valley, and the poor were never driven from his door; so that his barns became full of corn, and his house of treasure. And, for him, the river had, according to the dwarf's promise, become a River of Gold.

And, to this day, the inhabitants of the valley point out the place where the three drops of holy dew were cast into the stream, and trace the course of the Golden River under the ground, until it emerges in the Treasure Valley.

And at the top of the cataract of the Golden River are still to be seen two black stones, round which the waters howl mournfully every day at sunset; and these stones are still called by the people of the valley

THE BLACK BROTHERS.

The next Stories begin on page 1671.

The things inside a watch

THE STORY OF THE CLOCK

CONTINUED FROM 1418

ALFRED THE GREAT, one of the noblest kings who ever ruled over England, never saw a clock. He used to allow himself eight hours for work, eight hours for pleasure, and eight hours for sleep. When he wanted to fix the time like this, he had to have candles made which took a certain time to burn away, and so told him how the hours were passing.

Even that was better than many men were able to do. They knew how long a year was, because it takes the earth a year to go round the sun. They knew how long a month was, because it takes a month for the moon to go round the earth. They knew how long the day and the night were, because it takes just a day and a night, all but a few odd minutes, for the earth to turn once round. But all sorts of things had to be used before clocks were made to tell how an hour passed, and some of these ways of telling time are shown in pictures in the following pages.

But there is nothing so simple and so good as a clock, which tells us the time at a glance as soon as we have learned to understand it.

There are many different sorts of clocks. Some will go for years, once they have been wound up. Others will go for eight days; others need winding up every day. But, no matter how often they need winding up, and no matter how they are made to go, the thing they have to do is the same in all. A certain number of wheels have to be made to go round so regularly that it will always take them a certain time to do their work. When you wind up what is called a grandfather's clock, you wind strings on to a sort of barrel. At the end of the strings heavy weights are fixed. These weights hang down and are always pulling. The pulling makes the wheels go round, just as the pulling of a horse makes the cart go. The wheels have cogs, or teeth, and fit into the cogs of other wheels, and all have to go round at the same time, though not all as fast as one another. Some wheels have a lot of teeth, others have not so many. So while one wheel turns round in sixty seconds, or one minute, another wheel takes sixty minutes, or one hour, in which to turn round. All this twisting and turning is simply to make the hands work round and round over the face.

There are many parts always at work. There is the pendulum swinging, and there is the part which prevents the clock from doing its work too quickly or too slowly. If the clock goes too quickly, or gains time, as we say, we unwind a little screw at the bottom of the pendulum. This lets the weight at the end of the pendulum slip down a little, and causes the pendulum to swing more slowly. If the clock loses time, we wind the screw up a little. This makes the pendulum shorter, and causes it to swing a little

faster. Some clocks have no pendulum. They work with a spring. Then, instead of altering the pendulum, we have to move a little pointer. If we push it to the right, that makes the spring tighter, and makes the watch or clock go a little faster. If we push the pointer to the left, it makes the spring looser, and so causes the watch to go more slowly. But whether it be a clock with heavy weights, or a clock with a big strong spring, or ever so tiny a watch with a little spring just like a thread of steel, the work done is always the same. The long hand has to hop, little by little, round the face of the clock, from minute to minute. The hour hand goes from hour to hour.

THE CLOCK THAT RINGS A BELL TO TELL TIME IN THE DARK

Some clocks not only tell the time with their hands, but strike the hour. When the long minute hand points to the figure twelve, and the short hour hand points to one, a little hammer at the back of the clock gives one blow on a bell which is fixed at the top of the clock. This tells us that it is one o'clock, without our having to look. Some clocks strike as each quarter of an hour passes; others play a tune at the end of each hour.

Clocks and watches can be made to do very wonderful things. One watch, called the repeater watch, can be made to tell you what time it is even when you are in the dark. You have simply to press a knob, and a little bell rings out the number of the hour, and the number of the quarter-hours that have passed since that hour was reached. Then there is the alarm clock, which rings a bell at the hour for which you have set it.

THE CLOCK THAT SAVED A MAN'S LIFE BY MAKING A MISTAKE

So through day and night, week after week, year after year, the faithful clock goes on telling us the time. Some clocks last hundreds of years. The editor of this book has heard a tune played in Holland by a clock which was ticking when Napoleon was alive, and another in an old church in England which has lasted more than three hundred years. Both these clocks still tell the time as correctly as if they had been made only a year ago.

But nothing is perfect in this world, not even a clock. Once a man was saved from a cruel death by a mistake made by a clock. A sentinel, who was supposed to keep awake all night at the king's palace, was said to have fallen asleep while on duty, at twelve o'clock at night. Now, if they had been able to prove that he had been asleep, that poor soldier would have been shot, so he was very anxious to show that he was awake.

"I can prove that I was not asleep," the man said. "I heard Great Tom of Westminster strike thirteen."

At first they thought that this was a stupid story, because clocks do not strike more than twelve; but when inquiries were made it was found that what the man said was true. The clock had got something the matter with it that night, and it struck thirteen instead of twelve. That little mistake of the clock saved the soldier's life.

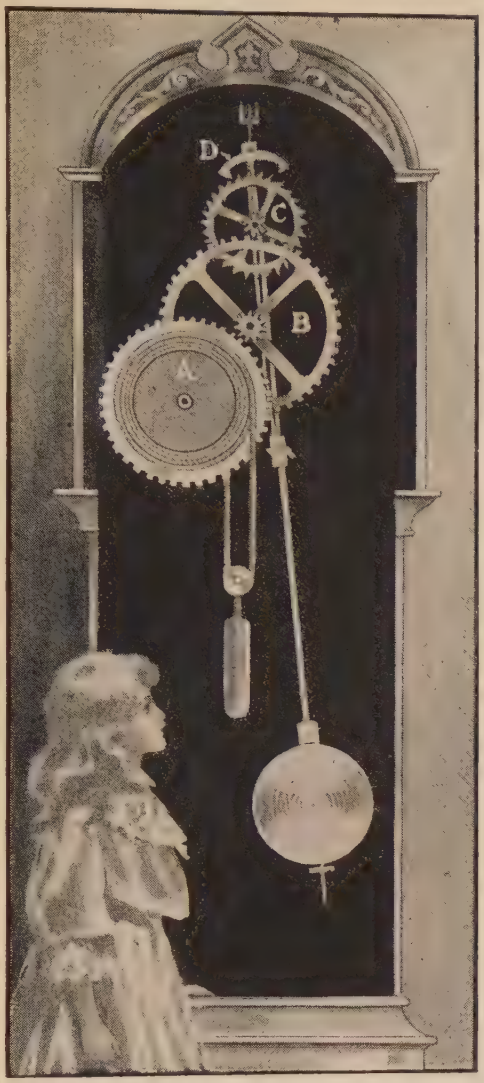
Great Tom of Westminster was the clock which Edward I. put up over the old Houses of Parliament. For 400 years it rang out the hours of day and night. It has gone now, and since 1858 Big Ben has reigned in its stead.

BIG BEN TELEGRAPHS HIS TIME TO GREENWICH TWICE A DAY

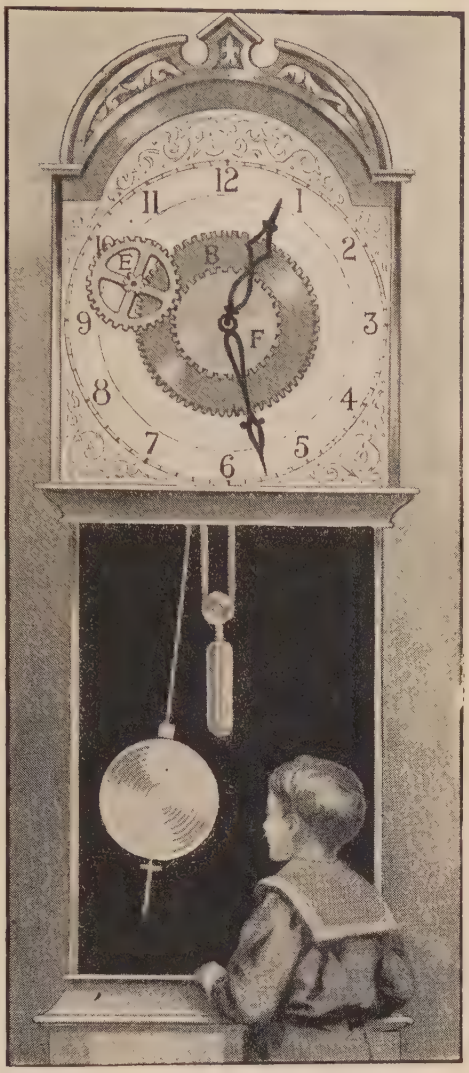
Big Ben has had a smooth career for many years, but it was not always so. The first Big Ben weighed 16 tons. Soon after it had been hung in its place, it cracked. The hammer was too heavy for it; the jarring had smashed it. That was taken down and the new one made, two years after the other.

The same thing happened again. The second Big Ben cracked, and for a long time the bell hung silent. At last they twisted Big Ben round in his tower, so as to make the hammer strike a part which had not been cracked. Then they got a smaller hammer, and for the last thirty years Big Ben has been ringing old days out and new days in, none the worse for the split in his side. The clock and its bells cost $110,000. Twice a day its works set going a machine which telegraphs Big Ben's time to Greenwich to see that it corresponds with the time there. So that day and night Big Ben is right. It can be seen from far and near when the sun is up, and at night the lights behind its face shine through the dials to tell the dark city what the hour is.

HOW THE WHEELS GO ROUND

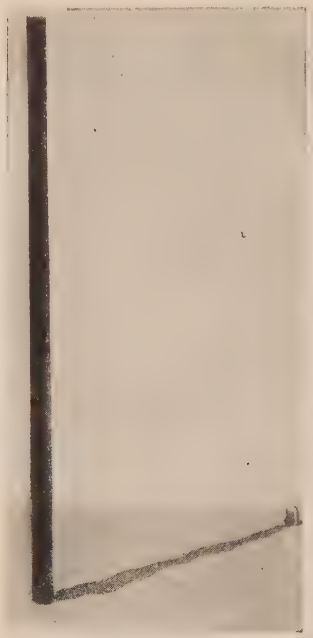


This picture of the inside of a clock shows us how the wheels go round. It is not the pendulum that makes the clock go; it is either a weight or a spring. In this grandfather's clock it is a weight. The weight is on a cord which passes round a broad wheel, called a barrel, marked A in the picture. The heavy weight pulls the cord downwards, and the cord, being wound round the barrel, pulls the barrel round. The edge of this barrel has teeth which work into the teeth of another wheel, marked B, so that both wheels go round. This second wheel causes the top wheel, marked C, to go round, and so all the wheels are set to work. But if that were all, the wheels would run round too quickly, and they must be made to run slowly and regularly. At the top is a curved piece of metal with a catch at each end; it is called the escapement, and is marked D. This swings to and fro, and every time it swings, it catches the top wheel and prevents it from going round more than one tooth.



This picture shows how the wheels make the hands go round. The three wheels shown in front of the clock, marked B, E, and F, are really behind the face. B, E, and F are necessary for the hands. Wheel F goes round once every hour, and as the minute hand is fixed to it, the wheel carries the minute hand round with it. Now wheel F touches wheel E with its edge, making it go round also. E is a double wheel, having near the centre a small wheel fixed to it with only six teeth; it is really on the other side of wheel E, but is shown in the picture in front for clearness. Each tooth in it fits into a tooth in wheel B, thus making that wheel go round. As wheel E goes round once in an hour, the six teeth in its centre carry round one-twelfth of wheel B, which has seventy-two teeth. The hour hand is fixed to wheel B, so while F is going once round, it makes wheel E drive B one-twelfth of its journey. Thus wheel F, with the minute hand, turns twelve times while wheel B, with the hour hand, turns once.

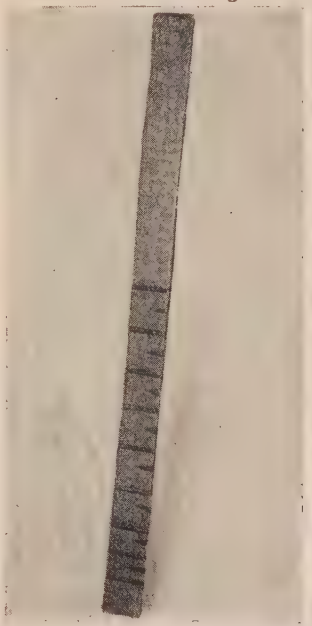
HOW MEN FIRST TOLD THE TIME



This was one of the first ways in which men told the time, fixing a stick upright in the ground and marking the spot reached by the shadow. This moves round the stick, becoming shorter before noon and longer after.

At night men marked a candle in equal sections in black and white, so that each section was burned in a given time. Alfred the Great is said to have invented this way of measuring the passing of time.

Here is a simpler method of telling the time by night. A hemp rope is knotted in regular spaces, and set light to at the bottom, smouldering slowly and regularly. In Korea people still tell time in this way.

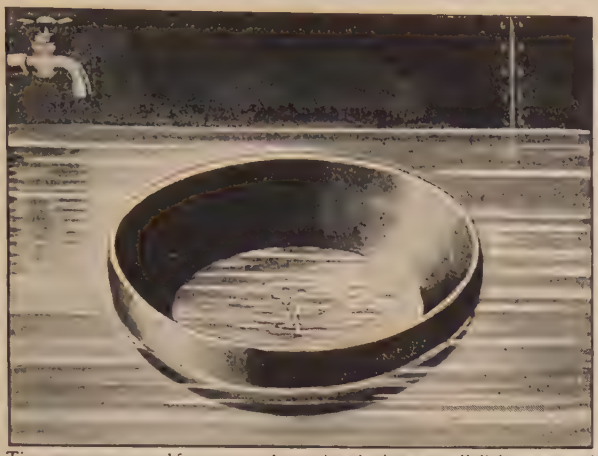


Here is a time-recorder. Every time a section of rope or candle is burnt through, or an hour-glass turned, the owner cuts a notch on a stick to mark the hours of vigil passed.

This is an hour-glass, like an egg-boiler used in kitchens. One end is filled with sand, which pours through a small hole into the bottom bulb. It was once used to measure sermons!

When a master and man wished to keep a record of time for wages, two sticks were used. The servant brought his part of the stick, and the farmer compared it with his own.

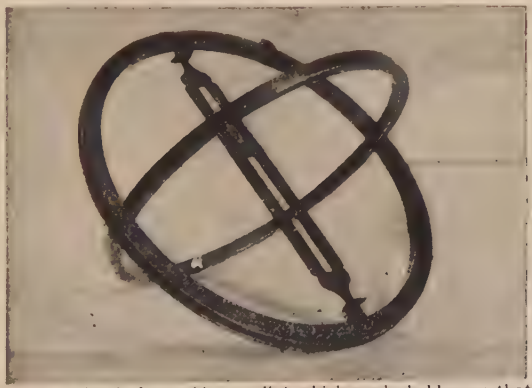
HOW MEN MEASURED TIME BY THE SUN



Time was measured for ages and ages by placing a small dish or a round basin in water and boring a hole in the bottom of it, the water flowing in, and gradually sinking it. This would always happen in the same period of time, so that men knew the time when the dish or water-clock sank.

This is a tiny rushlight holder. A rushlight was used before candles were made. It burns regularly, and was used by the poor for a long time after candles were invented.

There are very few people who have not seen a sun-dial, either on a house, or on a pedestal in a park. The dial is marked, and the time is told by the shade of the pointer falling on the different numbers. This is a toy in which the older children will be interested, and the article on page 1285 explains how to make one.



This is a kind of movable sun-dial, which can be held up so that the sunlight shines through a tiny hole in the straight piece of metal, and lights up one of the figures engraved inside of the circle, which is placed at a right angle to the straight piece.

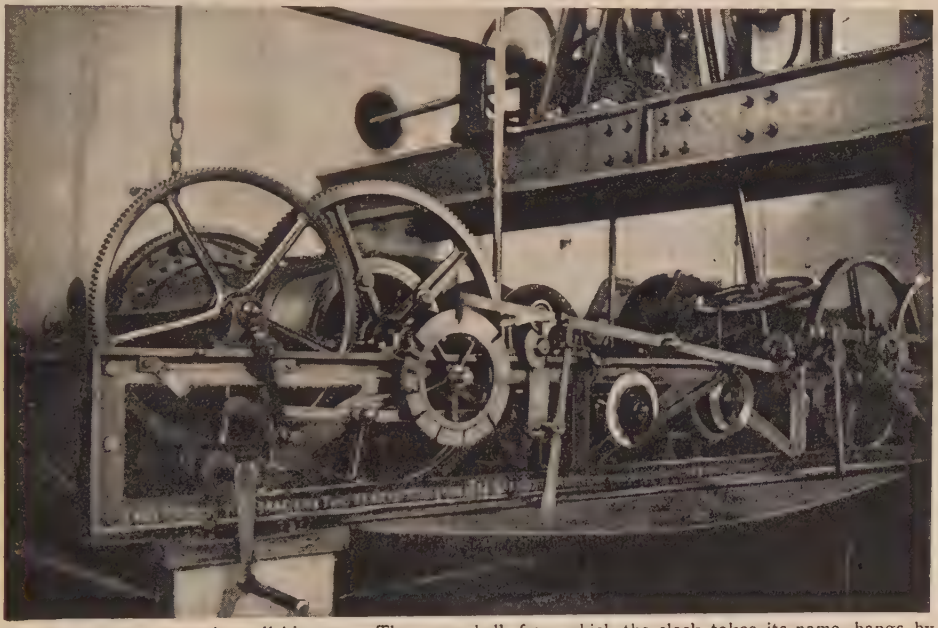
This is a primitive watch. It was always held in one position, and the sun, shining through the little hole, fell upon one of the numbers engraved on the inside of the circle, as shown here.

BEHIND THE GREAT FACE OF BIG BEN

At the top of 360 steps in the Clock Tower at Westminster, Big Ben has marked time for London for fifty years. It is not possible to understand the size of the clock as we stand on the ground. It has four faces, each 23 feet across—nine or ten times as wide as a door. The minute hands are 14 feet long; they would reach higher than an ordinary room. The pendulum weighs nearly 450 lb. The figures on the face are each two feet long, and the minute spaces are a foot square. If you will look closely at your watch, you will see the minute hand move in little jumps; the minute hand of Big Ben jumps half a foot every time it moves. It is not easy to believe these figures, but that is because our eyes deceive us when we look up to a great height, and Big Ben stands so high that if thirty tall men stood on one another's shoulders the top man would only just touch the middle of its face.

THE BIG BELL OF BIG BEN

Big Ben is the great bell which strikes the hours at the Houses of Parliament. It is made of copper and tin, and is nearly 8 feet high and 9½ feet wide at the bottom. But Big Ben is not the largest bell in London. The largest is Great Paul, at St. Paul's Cathedral. Great Paul weighs 17½ tons, and its hammer weighs 180 lb.



Big Ben needs a workshop all his own. The great bell, from which the clock takes its name, hangs by 1,600 feet of chain from an oak beam bound in iron plates. It weighs 13½ tons, and the hammer with which the hours are struck weighs about 450 lb. There is a great noise in the room when the bell is about to strike, and the machine shown in the bottom picture has to be wound up three times a week to give Big Ben the power to strike the hours. It takes two men about five hours to wind up Big Ben for striking.

HOW TO TELL TIME BY THE CLOCK

THE clock-face has a ring of large figures from 1 to 12; these mark the hours. Outside these large figures is a ring of tiny marks; these mark the minutes. One of the hands is longer than the other; the long hand marks the minutes and the short hand marks the hours.

When the short hand points to 1 and the long hand is exactly at the top of the clock-face over 12, it is 1 o'clock. When the short hand points exactly to one of the large figures, the long hand is always at the top, and it is exactly the hour.

But if the short hand is a little past one of the large figures it is some minutes past the hour, and we know exactly how many minutes it is by counting the tiny marks on the outer ring. There are five of these marks between each of the large figures, so that when the long hand is at 2 it is 10 minutes—twice 5 minutes—past the hour.

The minute hand goes round the clock once in an hour; the short hand goes from one large figure to the next in an hour. When the long hand is a quarter of the way round, it is a quarter-past the hour to which the short hand points; when the long hand is half-way round, it is half-past the hour. Here is a full and simple explanation of the face of a clock.

THE face of a clock is divided into 12 clear wide spaces and 60 narrow ones, and each wide space stands for two things. It takes the long hand 5 minutes to cross one wide space, and the short hand one hour to cross the same space.

A minute is 60 seconds, and an hour is 60 minutes. The clock begins with the minutes, and the face of the clock is marked off with tiny lines into 60 narrow spaces. The large hand marks the minutes, and takes exactly one minute to cross one of these narrow spaces. So that this hand takes exactly one hour, or 60 minutes, to pass all the narrow spaces round the clock.

But it would never do to have 60 small spaces and to leave us to guess the exact space which the long hand touched. Put 60 matches in a row on the table, touch one near the middle, and ask somebody to tell you the number of the match you touch, and you will see that a great deal of slow counting is necessary to get the proper number. It would never do to have to spend so long in finding out the time.

So the wise clockmakers mark off 60 narrow spaces into 12 divisions, each division having 5 narrow spaces. When we have to count with our eyes, as we do with the clock, it is hard to pick out one in 60, but it is easy to pick out one in 5, and we have now 12 simple divisions, each with 5 spaces. It takes the long hand 5 minutes to cross one of these divisions, 10 minutes to cross two of them, and 60 minutes, or 12 times 5, to cross them all. When the long hand has crossed all these divisions, therefore, we know that 60 minutes, or one hour, has gone.

That is simple. The long hand crosses one narrow space in 1 minute, two in 2 minutes, 60 in 60 minutes. Once round the clock by the long hand is an hour. If we had only to think of minutes, that would be quite enough; but as we reckon time in hours and days, and as there are 24 hours in a day, we must have some means of counting hours, as well as minutes, by the clock. So the clock is marked off into hours, as well as minutes, and the hours are marked in a very clever way.

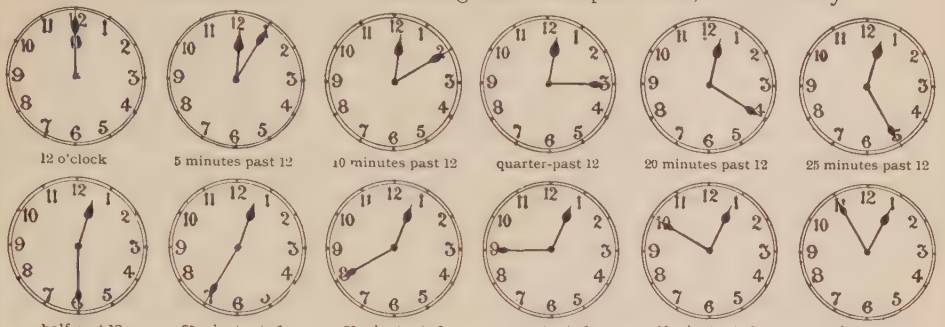
We do not count 24 hours, but only 12, because twice 12 are 24, and it is simple to count 12 hours before the middle of the day, and 12 after. The clock, therefore, has 12 hours marked, and goes round from 1 to 12, when it begins again at 1. We call the first part of the day A.M., which means *before noon*, and the second part P.M., which means *after noon;* and whenever the clock points to 3, or to 4, we know whether it is before or after middle day.

The cleverness of the way in which the clock marks the hours is this. We know that the 60 minute marks are marked off into 12 divisions, and there must therefore be 12 dividing walls to separate them. Now, as the clock needs 12 signs to mark the hours, the figures from 1 to 12 are used to mark off the 12 divisions, and to mark the 12 hours as well.

So that, instead of needing two clock-faces, one for minutes and one for hours, one face serves for both. While the long hand marks the minutes at the narrow spaces, the short hand marks the hours at the 12 big figures between the spaces.

Let us see how this works. We set the clock, let us say, at noon, which is 12 o'clock. Both hands point exactly to 12. In 5 minutes the long hand has crossed the first space, and is opposite the first dividing wall, which is the big

figure 1. That is 5 minutes past 1. In 10 minutes the long hand has crossed the second space, and is opposite the second dividing wall, which is the big figure 2. That is 10 minutes past 1. So the long hand creeps round, in this way :



We can easily count the divisions because the big figures tell us. Thus, when the long hand points to the big figure 4, we know that it has crossed 4 divisions, and, as 4 times 5 is 20, we know that 20 minutes have gone. If the long hand points to the big figure 6, we know it has crossed 6 divisions ; and 6 times 5 are 30, so that 30 minutes have gone, or half an hour.

All this time, of course, the short hand of the clock is moving also, very slowly, and by the time the long hand has gone right round to 12 again, the short hand has travelled to the big figure 1, and it is therefore 1 o'clock. When the long hand has gone right round twice, the short hand has crossed 2 divisions, and points to the big figure 2 ; and it is therefore 2 o'clock.

Remember that the big figures mark the hours only, not the minutes, so that when the long hand points to the big figure 2 we must not think it is 2 minutes past something. It is *two spaces past*—that is, 2 times 5 minutes. We are only to count the big 2 as 2 when the short hand points to it.

An exact hour is marked when the long hand is at the beginning of its round, opposite 12, and the short hand points to a big figure. The hours are shown here :

When the long hand is on the right side of the circle, we say that it is so many minutes *past* the hour. But when the long hand begins to go up the left side, we say it is so many minutes *to* the next hour. You can say that it is 40 minutes past 2 ; but it is much easier to say that it is 20 minutes to 3, and both these mean quite the same.

So as long as the long hand is to the right of the clock-face, we say that it is *past* the hour ; when the long hand is to the left of the clock-face, we think of the next hour, and say that it is so many minutes *to* it. For the first half-hour we read forward, for the second half-hour we read backward.

Some clocks are marked in plain figures, but most are marked in the figures the Romans used, called Roman numerals. Here is a table of them, from 1 to 12 : I=1 II=2 III=3 IV=4 V=5 VI=6 VII=7 VIII=8 IX=9 X=10 XI=11 XII=12.

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 1639

HOW INDIA LIES BETWEEN MOUNTAIN & SEA

India, for hundreds of years, lived a life peculiarly its own, cut off from the rest of Asia by the highest mountains in the world. The only ways of reaching this wonderful country are over the mountains or by the sea, and the wild storms of the Indian Ocean prevented the small ships of the earliest sea rovers from reaching it. So that India remained an almost unknown land to the West until the ships of the European nations rounded the Cape of Good Hope. There are but few openings in the mountains of the north-west, such as the Khyber and Bolan Passes.

Camels carrying the merchandise of India over a bridge of boats

INDIA, THE PEARL OF THE EAST

CONTINUED FROM 1466

FAR away in the East, on the south side of the continent of Asia, lies the vast country called India, full of people who are very unlike our own countrymen—people who talk a strange language, and wear strange clothes, and live in strange houses, and have strange manners and customs, and strange religions; people who are not all like one another, as English and Scots and Irish are alike, but just as different as they are from Spaniards, or Italians, or Germans.

Yet they all have a kind of likeness, just as all the European peoples have a kind of likeness; they are different from one another, but not so different as they all are from Europeans. For India is a very large country, as large as Germany and Austria and France and Spain all rolled into one; so large that there are about three times as many people in it as there are in our own country—nearly 300 millions of people! And it is the business of a few thousands of English people to rule over all those millions; to give them good laws, and to make sure that the laws are obeyed; to prevent the strong from injuring the weak, and the cunning from injuring the simple; to give justice to all with an even hand.

India is not only a very big country, but mountains and rivers and plains, the geographical features, are what we call on a very big scale—as if we looked at the things to which we are accustomed through a powerful magnifying glass. The highest mountain in the whole world, Mount Everest, is on the Indian frontier; it is more than four times as high as Mount Mitchell, one half higher than Mount McKinley, and nearly twice as high as the biggest in Europe, Mont Blanc.

The two biggest rivers, the Indus and the Ganges, are not quite so large as the Volga or the Danube, but are both five times as long as our own Hudson. And in like manner, the biggest kinds of wild animals live in India—elephants, which man has tamed for his own service; lions, though they are few now; great leopards and tigers, the strongest and most beautiful and most cruel of all the cousins of our tame cats; and fierce wild cattle, with mighty horns, which the tiger himself is often afraid to fight; and crocodiles in the rivers, which will drag down men and cattle if they catch them; and snakes, large and small, including the most terrible of all, the deadly cobra, for whose bite there is no cure. Again, in like manner, the Indian sun scorches with a heat we can hardly imagine in New York, and rain falls in rushing torrents such as we never see in the biggest thunderstorms that burst on our own country.

Now let us look at the whole of this big country, with the map appearing on the opposite page, and notice the important things about its formation, its boundaries, its mountains, its rivers and plains.

HOW INDIA IS HEMMED IN BY THE MOUNTAINS AND THE SEA

First of all you see that the southern half of India is a triangle or wedge, pushed out into the Indian Ocean, so that it is bounded on the south-west and on the north-east by the sea. This part we call the Peninsula. And then you see that a huge chain of mountains curves in a rather crooked sort of way from the top left-hand or western corner of the Peninsula northwards, and then eastwards till it comes down to the top right-hand corner; so that on the north-west, and north and north-east, India is bounded by mountains.

You cannot get at India at all, unless you come to it by sea or make your way through the mountains. And those mountains are so high and so difficult to get through, that there are really only two passes by which armies have been able to get into India, and both of these are on the north-west side. So that if those passes are so well guarded that an enemy cannot force his way through, an invader cannot get into India unless he comes across the sea. There, you see, is a very good reason why the peoples who inhabit India grew up apart from other nations, so as to be unlike them, keeping their own manners and customs; for in ancient times, fleets of ships could not make long sea voyages as they do now, and the coast of the Peninsula was too far away from other lands for anyone to think of invading India by sea. Sea and mountains were a barrier between the Empire of India and the rest of the world.

THE NORTHERN HALF OF INDIA WHICH IS CALLED HINDUSTAN

The next thing to notice is that the wedge broadens out a great deal at the top, and just below the place where it broadens is a river which rises a little east of the middle of the country, and flows very nearly due west, till it falls into the western sea. This river is called the Nerbudda, and it divides India into a northern half, which is called Hindustan, and a southern half, which is called the Deccan.

Now, in Hindustan are two very big rivers. On the west, flowing almost from north to south along the foot of the barrier-mountains, is the Indus; and several other rivers join together and flow into the Indus when it is about half way on its journey to the coast. The land through which these rivers flow, down to where they all join the Indus, is called the Punjab, which means the Land of the Five Rivers. The other great river, which flows from west to east, is called the Ganges, and some people, when they talk of Hindustan, mean just that great low-lying plain watered by the Ganges and the rivers which are its tributaries. The plain, or basin, of the Ganges is the most fertile part of India. But between the lower part of the Indus on the west and the Ganges on the east, there is a great deal of country where there are no rivers at all, and very much of this is desert.

THE SOUTHERN HALF OF INDIA WHICH IS CALLED THE DECCAN

In the Deccan there is nothing like the great plain of the Ganges, or even the Punjab. Most of it is high table-land; steep on the west side, where the mountains are called the Western Ghats, and there is only a narrow strip of low land lying between the hills and the coast; but shelving down on the eastern side, so that here and there are wide plains which form the district called the Carnatic. One of the great rivers of the Deccan is called the Godavery; it is famous for some very wonderful waterfalls. Right in the heart of the Deccan there is a place called Golconda, which was once the capital of a mighty kingdom. In those regions great store of gems was found, and these were brought to the jewellers of Golconda, so that the wealth of Golconda became a proverb.

India is a very hot country. Sometimes in winter, up among the high barrier-mountains—which are hardly in India—it is quite cold. All other places, even the coolest, are much warmer than England; and in all the great plains where the rivers flow, and still more in those plains where there are no rivers, it is always hot. In the hot season the heat is so trying that many Europeans become ill if they stay long, so that English people have

In India most of the people earn their living by growing rice, wheat, and other crops. They are their own millers, and here we see some friends who have gathered together outside one of their thatched huts to grind some rice by placing it into a stone jar and pounding it with short poles. While doing this they can talk to one another and look after their children playing round them. Life among these people is very quiet and peaceful, unlike that of our city people, who spend their lives in mills, factories, and workshops, amid the ceaseless whir of machinery. The Indians weave beautiful shawls and carpets, and hammer and carve out beautiful brass pots and tables such as we all know and use in our homes. Their needs are few and simple.

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taken to going up to "the hills" in the hot weather, or, at least, to sending their wives and children to the hills if they have to stay behind themselves; and it is hardly safe to go out of doors, except early in the morning and late in the evening. For that reason, too, there are very few places where it is possible for English children to grow up strong and healthy; so that when Englishmen in India marry, they know that sooner or later they will have to send their children home to be brought up in England, and that their wives will often have to choose between being parted from their children and being parted from their husbands.

There are many great cities in India, of which the largest is Calcutta. In old times, and until quite a short time ago, the British people who were at the head of the Government in India used to live at Calcutta; but now they generally live at Simla, which is in the hills, because Simla is healthy, and Calcutta is terribly hot.

THE GREAT RIVERS OF INDIA AND THE GREAT PORTS ON THEIR BANKS

Long before the Ganges reaches the sea, it divides into a number of rivers, one of which is called the Hoogli. The names of places in India are rather puzzling, because there are different ways of spelling them; but they are spelt here so that you can read them just as if they were English words, and then you will pronounce them as English people usually pronounce them; only you must remember generally to sound the letter *a* either the same way as in *call*—for instance, in Bengal; or as in *can't*—for instance, in Punjab.

Ships can sail up the Hoogli, and so a place on the banks of the Hoogli became a port, which grew into Calcutta, as our port on the Hudson grew into New York. The second great port of India is on the west, at Bombay, which was given to Charles II. of England by the Portuguese as part of the dowry of his bride, Catharine of Braganza. The third is Karachi, on the Indus. There are other harbours on the west coast, but none so large; and on the east no good ones at all, though ships can get fair shelter off Madras. When the gales, which are called "monsoons," blow, as they do regularly at certain seasons of the year, fleets cannot remain in safety on that part of the coast.

Most of the great towns in England and Scotland have grown large either because they were ports to which foreign merchants came with their goods and from which English merchants sent their ships, or because there are big "works" there for manufacturing something, like steel or cotton or pottery; and most of the people make their living by working at some industry or other of this kind, or by buying and selling the goods that are manufactured.

HOW THE GREAT AND BUSY CITIES OF INDIA GREW UP

But in India, most of the people make their living by tilling the soil, which grows rice or wheat or millet. There the big cities grew up because emperors and kings found they were convenient places to build their palaces in, as they could be well fortified; and as the kings lived there with their courts, men collected round them, that the people of the court might buy their goods, and that they might be protected against robbers or the raids of enemies. And other cities grew up on spots which were held sacred, as sometimes in Europe towns grew more quickly where there was a famous cathedral or abbey. So that the largest towns, except the few ports, were generally at one time either the capital of a kingdom, or places to which people went on pilgrimages, or strong fortresses.

In India there are very few manufactures such as we have, which bring together great numbers of men to work in factories, and the big cities are therefore few. You can travel immense distances without seeing one at all, and in other places where, in ancient times, great cities have stood, are the ruins of buildings that were once magnificent.

DELHI AND THE PEACOCK THRONE, AND AGRA WITH THE WONDERFUL TOMB

Of the old cities, the most famous of all is Delhi, because for many centuries the mightiest monarchs in all India reigned there—even for centuries before the great Moguls made themselves lords of India. There, in old times, was the wondrous peacock throne, gleaming with precious stones, said to have been worth millions of pounds. A conqueror came and carried it away, and the jewels were scattered. But the most beautiful

ONE OF THE MOST REMARKABLE LIVING SCENES IN ALL THE WORLD

This striking photograph shows us one of the most remarkable sights to be seen anywhere in the world—the bathing of an immense crowd of people in water overflowing from the great River Ganges, in Northern India. The people believe that the water is sacred, and hundreds of thousands of pilgrims bathe in it, believing that some good will come to them.

buildings in India are at a much younger city—Agra. There are people who think that the Mohammedan mosque, or temple, called the Pearl Mosque, or the Moti Musjid, and a fine tomb called the Taj Mahal, are the most beautiful buildings in the world. The Taj, which is, perhaps, the most famous building in India, was built by one of the Moguls named Shah Jehan, as a memorial to the wife he loved, who lies buried under its dome with Shah Jehan beside her. Here also Shah Jehan built the White Palace, which is one of the fairest palaces in the whole of the world.

THE KIND OF PEOPLE YOU WOULD MEET IN A WALK IN INDIA

Now think of this—that if you travelled all over India and saw all the people there, not so many as one in every thousand would be white. That is to say, all the natives have brown skins—some dark brown, some light brown, but all brown; and there are a thousand natives for every European. Out of them all, very few indeed are Christians; the religion of nearly three-quarters of them is Hindooism, and nearly one-quarter are Mohammedans, or, as they are often called, Mussulmans.

The Mussulmans believe in the teaching of Mahomet, who, they think, was a prophet sent by God. A great many of the Mussulmans—most of them, perhaps—belong to races which have fought their way over India as conquering armies some time or other during the last thousand years. Some of these are Moguls, or Turcomans; more are Afghans, or Pathans. (Remember to pronounce the two *a's* in each of those words just as you pronounce the *a* in *pass;* and also to pronounce *t* and *h* in Pathans separately, as in *at home*, not together, as in *the*.)

THE GREAT DIVISION BETWEEN THE MUSSULMAN AND THE HINDOO

These Mussulmans think of themselves as soldiers, descended from a race of victorious soldiers, who have been rulers of the country in the past, and there is a great division between them and the Hindoos, whom they look upon as infidels. Hindoos and Mussulmans keep separate; they do not marry each other, and in many parts of the country, even under British rule, they can hardly be kept from fighting each other.

Most of the people in India, however, are Hindoos, just as most people in Europe are Christians; but there are differences in the religion of Hindoos, just as there are among Christians. According to the Hindoo religion, there are an immense number of gods, and different gods are held in honour in different parts of the country and among different classes of people, who believe that they are under the protection of this or that particular god. Some of these gods are worshipped with strange rites, and some used to be worshipped with rites that were even horrible, until they were forbidden by the British. Men and women used to torture themselves hideously, thinking to please the gods thereby. English people used to believe that at the festival of one of these gods called Juggernaut—which was only one of his many titles, and meant Lord of the World—the Hindoos threw themselves down before the great car on which the idol was dragged from one temple to another, thinking that if they were crushed to death under the car they would win happiness in the life hereafter; but that was not really true.

TERRIBLE THINGS THAT HAPPENED IN THE PAST, AND THE CUSTOM CALLED "CASTE"

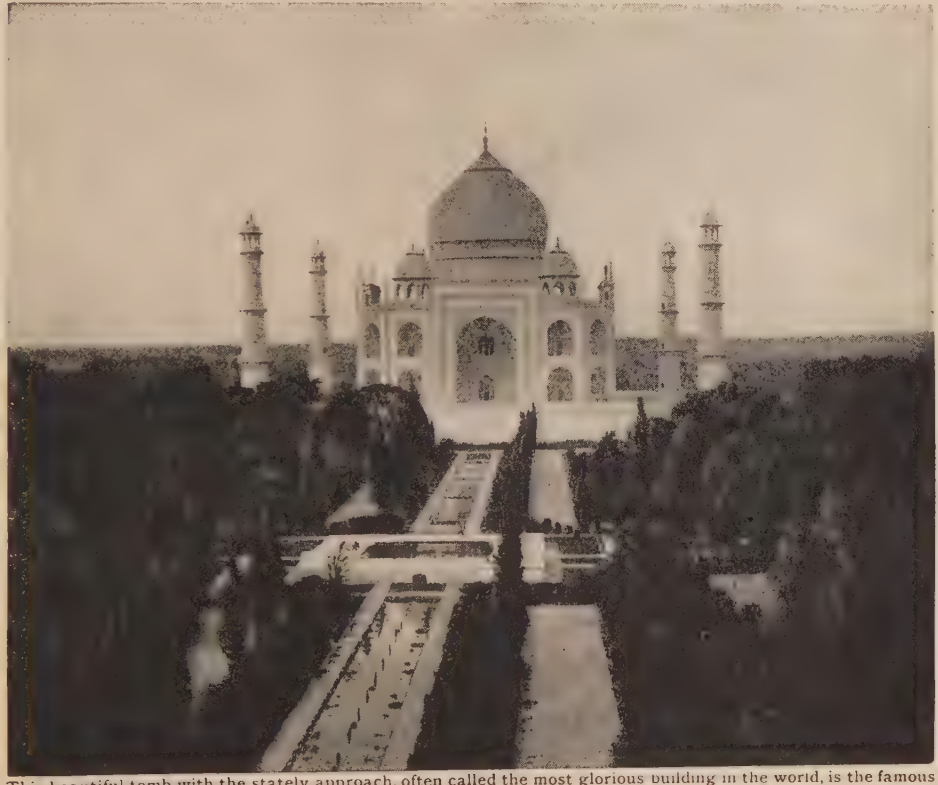
Perhaps it was believed because people really did die from their exertions in dragging the car. But the "car of Juggernaut" has become a proverb. Great temples, or shrines, were built long ago in honour of some of these gods, which have in them wonderful carvings and idols or images.

Less than a hundred years ago, there was a practice among the Hindoos which seems to us very shocking. When a man died, his body was burned; but the custom was for the widow, if she wished to be praised and to be remembered for her virtue, to burn herself alive on her husband's funeral pyre. And because this was supposed to bring some great good to the husband in the life to come, the widows were often forced to do this by the dead man's kinsfolk. This was called "suttee." It is never done now, however, because the British stopped it about eighty years ago.

The most remarkable and important custom among the Hindoos is what is called caste. In ancient times, there

THE WONDER AND BEAUTY OF INDIA

Nowhere in the world are there such splendid and wonderful buildings as in the East, and the temples and tombs of India are the things that impress all travellers. Not only did the old rulers of India build themselves glorious palaces to live in during their lives, but they built stately tombs for themselves to lie in. The beautiful buildings in this picture are the tombs of the kings of Golconda. The bodies are placed directly under the domes.



This beautiful tomb with the stately approach, often called the most glorious building in the world, is the famous Taj Mahal at Agra, built by the Mogul Emperor Shah Jehan, as a memorial to his wife. He lies buried beside her.

were four divisions among them, each of which kept separate from the others, and married wives who belonged to their own division, or caste; and the children were of the parents' caste. The priests and teachers belonged to one caste, who were called Brahmins; and the soldiers to another. These, and also the third caste, were parts of a race which conquered most of India; but the fourth caste were considered as base-born, because they belonged to the conquered peoples; and the conquerors imagined that they themselves were not only superior in this world, but would be superior also in the next life. Among themselves they supposed that the Brahmins were superior to all the others, and the warriors to the third caste. If a man broke certain laws, however, even if he were not really to blame, he was degraded from his own caste and became no better than one of the base-born; therefore it was held to be a very terrible thing to lose caste.

THE GREAT NUMBER OF SMALL PARTS INTO WHICH THE PEOPLE ARE SPLIT UP

But afterwards, each of these great castes broke up into a number of smaller castes, which are just as particular about not marrying into other castes. High-caste people will not touch food that is cooked by people of low caste; and if people eat certain kinds of food, or if they cross the sea, or if they do many other things which seem to us not to matter at all, they lose their caste, and can only save themselves by suffering certain punishments. There is nothing the Hindoo fears so much as doing anything which will cause him to lose caste, and there has often been trouble because of Europeans forgetting how much they think about it, and making rules for soldiers or giving orders to servants against the caste rules.

There are some animals, too, which the Hindoos look upon as sacred. The most sacred of all is the cow, so that to kill or injure a cow is a terrible sin in the eyes of a Hindoo. But the Mussulmans think it sin to hold animals sacred, or to pay honour to images and idols, for the Mohammedans worship the true God, as the Christians do; but because Christians believe that Christ is the Son of God, and that Mahomet was simply a great leader of men, the Mohammedans think that Christians and Jews are really no better than heathens and idolaters. But the Hindoos think that the Mussulmans and the Christians, being of no caste, are certainly no better than their own lowest caste.

HOW THE BRITISH RULE OVER THE VAST EMPIRE OF INDIA

Now, all these Hindoos and Mussulmans are ruled over by the British. In about half the country, all the people who look after the Government are British, except that a few natives are allowed some share in the work. In these parts of India there are a number of regiments of soldiers from Great Britain, and nearly twice as many regiments of native soldiers; but in these native regiments the higher officers are British. If you speak of men in the Indian Civil Service, that generally means that they are in charge of a big or small district in these parts.

The other half of India is made up of a number of native states, ruled over by their own native princes, who generally have the title of Rajah or Maharajah; and these princes have their own armies, though they are not allowed to have enough soldiers to become dangerous. A British officer, who may be either a soldier or a member of the Civil Service, lives near the court of each of these princes; sometimes he is called the Resident, and sometimes the Agent. It is his business to see that the native princes govern properly, though he does not interfere unless they govern really badly; and it is his business also to give advice, and to keep the Viceroy of India and his Council informed about everything of importance that is going on.

THE NATIVE PRINCES WHO ARE LOYAL TO THE BRITISH FLAG

For at the head of the whole Government of India is the Viceroy, or Governor-General, and his Council; and when the Viceroy says that a native prince must do this or must not do that, the prince must obey. How it came about that these native states were built up; how the British first became rulers of one bit of India 150 years ago; how they had to go on bringing one province after another under their own rule, and finally to require the obedience of all the native states—the story of all this we have now to read.

The next story of India begins on 1699.

WHAT THIS STORY TELLS US

AN atom, we know, is built out of tiny bricks of electricity called electrons. In these pages we learn how tiny the electrons are—far tinier than the atoms of the elements, though these are infinitely tinier than anything we can see. The atom, then, is a building; but it is a building that is in motion all the time, for its bricks are never still. These bricks, or electrons, really move inside the atom, probably like the planets moving in the solar system. The atom is a little world, countless billions of which make up the big world we know--whilst that big world is perhaps only an atom in a world bigger still. In the atom-world there must be some central power which keeps it all together, as the sun keeps everything together in the world we call the solar system. We know almost nothing about this power as yet; but we learn here what is known about the electrons which it holds together to make the atom, how they move, and what they are made of.

THE WORLD INSIDE AN ATOM

CONTINUED FROM 1422

WE have learned something of the wonderful little bits of electricity called electrons that fly about in the atoms; and we may now think for a minute or two about the size of these. They are so small that we can only give ourselves some faint idea of their size by a comparison. Evidently we must begin by trying to get some idea of the size of the ordinary atoms of matter. That great genius, Lord Kelvin, the greatest student of these subjects since Newton, devoted some time and trouble to this subject. His opinion was expressed in some such way as this: A drop of water, we know, is made up of molecules of water, each of them consisting of three atoms.

Doubtless an oxygen atom is much bigger than a hydrogen atom; but, in the question we are talking about, we need not trouble about that. Let us try to suppose, then, that a single drop of water were magnified so enormously as to be the size of the earth.

Then the atoms that make it up would appear probably somewhere between the size of small shot and a tennis-ball. Perhaps it might help us a little to look at the matter in the opposite direction. Imagine this great earth of ours, twenty-five thousand miles round, made of, let us say, one great heap of marbles; and then think of that whole earth shrinking down into the size of a drop of water, and try to imagine how small those marbles would have to be. Yet that would be something like the size of the actual atoms in an actual drop of water.

Well, when Lord Kelvin made this calculation—which was not a matter of mere guessing, but depended upon many things, such as the changes in colour of a soap-bubble as it gets thinner—he was thinking of atoms as the simplest and smallest possible units of matter. But now we are to think of atoms as themselves made of things which are smaller still; and the question is, How much smaller? Let us imagine that we could take a single atom of average size and make it as large as some great hall or church—I mean a very large hall, or a cathedral, rather than an ordinary church. Now, according to the old view, an atom magnified like that would look like one great, simple, solid crystal, sharply defined, nowhere worn, having no parts, and incapable of being divided up.

But, according to the new view, the atom would be much more like a great hall, for there would be plenty of space in it that was not filled; it would be roomy, so to say. But in it there would be contained various things which made it up. These would be flying about inside it, probably round and round, in a quite orderly way, somewhat as the planets fly round the sun in the solar system. And the size of these things—which we have learned to call electrons—would be about the size

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of a period on this page if the atom were magnified to be the size of a large hall. Now, the size of a period, compared with the size of a great hall is, of course, the tiniest of tiny things; and yet we have learned that the atom is really so small that if a drop of water were magnified to the size of the whole earth, the atoms would only be about the size of marbles.

LOOK AT A PERIOD ON THIS PAGE AND THINK WHAT IT IS

This is the best that we can do in order to give us some little idea of the tiny size of an electron; and we may remind ourselves here that, so far as all the evidence goes, this size is a constant, fixed, and universal thing, true of all electrons, whatever atom they come from, and whether that atom be found on earth or in the sun or anywhere else.

These ideas are so big, though the things with which they deal are so small, that we can scarcely realise them. Let us, then, just look at the period which ended the last sentence, and try to see with the mind's eye what it is really made of. It is a small and neat round blot of black ink on the page. This ink is made of various things—some put in to make it sticky, some put in to make it black, and so on. But we may describe it as a solution of certain salts of the wonderful metal iron, about which we have read something already. It is one of the peculiarities of the salts of iron that they are nearly all richly coloured. The amount of salt in the blot of ink we call a full-stop is not very much, but it must contain certainly millions of millions of atoms—some of them of iron, and others of the various elements making up the particular salts of iron and other things in the ink.

A PERIOD HAS MORE PARTS THAN THERE ARE PEOPLE ON THE EARTH

If as many more atoms were added to the blot as there are human beings on the whole earth—say, sixteen hundred millions—even that number would not nearly be sufficient to make the blot look any larger to our eyes. Yet each of those atoms, tiny though it must be, is itself, compared with the things in it, a great roomy space in which they fly about; and the size of those things or electrons compared with it is like the size of a period compared with a great hall.

These ways of trying to express the size of electrons are much more valuable than we might think. It is not merely that they give us some little idea of what the sizes really are. They do far more than that. We can use these pictures to give us some idea of what the structure of the atom really is.

We said that if the atom were the size of a great hall, the electrons would fly about in it—perhaps rather like the earth and the other planets flying round the sun. Now, some of the greatest thinkers at the present day have made us see that this is something more than a mere fancy picture. They are deliberately asking us to think of the atom as if it were a sort of solar system.

The solar system, we know, is roomy. I mean that, though there are several planets in it, yet there is abundance of room between them. Even at times when the earth is nearest to her nearest neighbour, Mars, there are tens of millions of miles between them. Another way of saying this would be that, compared with the size of the whole solar system, the planets which help to make it up are very tiny, so that there is abundance of room between them.

THE WONDERFUL MOVEMENT GOING ON FOR EVER INSIDE AN ATOM

Now, the same is true of the electrons in the atom. Though the atom itself is so tiny, yet the electrons are so much tinier that, compared with their own size, there is as much room between them as they circle round within the atom as there is between the planets as they circle round within the solar system.

For there is every reason to believe that the electrons *do* move round within the atom. We have no right to say that they move round in regular circles, nor in regular ellipses, as the planets do in the solar system; but we know for certain that they are always moving, and that they move in a regular, orderly, systematic way. We are sure, indeed, that, just as we may speak of a *solar system*, so we must now speak of an *atomic system*; and every atom is an atomic system. We shall begin to see how great this discovery is if we remember that for thousands of years we have been told that we should look upon matter as gross, brute, dead, inert, passive, inactive. We are now

learning that the atoms making up matter, which we were told is inert and dead, are the scene of tremendous forces of ceaseless and wonderful activity, not one whit less wonderful than the solar system itself, for wonderfulness is not a matter of size.

Now, what is it that keeps the solar system together and makes a system of it? We know very well that it is the attraction of the sun. The system has a centre from which it is controlled, and by which it is kept in order. If the sun were to vanish, all the planets, instead of flying round it, would begin to move in straight lines, and soon there would be no system at all, nor anything like it. Even if the sun were only to lose its power of attraction, the planets would immediately fly away, and there would be an end of the solar system.

Now let us consider the case of the atom. The electrons in it are moving with great speed and power; they are all of the same kind, and a notable fact about them is that their tendency is not to attract but to repel each other.

THE THING THAT KEEPS THE ELECTRONS FROM FLYING OUT OF THE ATOM

An electron tends to push away, and to be pushed away from, any other electron. Yet large numbers of these little bodies exist in the atom, though the tendency of each is to fly away from all the others. Further than this, they are in motion, and the tendency of everything which is in motion is to go on moving in a straight line for ever. Yet, at any given time, most of them remain within the atomic system, just as the earth remains within the solar system. It is the central attraction of the sun which prevents the earth from flying away. Must we not, then, argue that the existence of the atom would be impossible if there were not some central attraction preventing the electrons from flying away, so powerful that the electrons can all keep together, even though their tendency is to repel each other?

There is no doubt as to this. Just as the solar system would be impossible without the sun, so the existence of an atom would be impossible without the presence of some force within it which held together and controlled all the electrons that go to compose it. And here we come upon something new and must use two new words. We say—though in so saying we must not fancy that we fully understand what we are talking about—that electricity may exist in two kinds. We are not here talking about *electric waves* at all; they are utterly different, and some day when we have more sense they will have a special name. These two kinds are contrasted with each other, and for convenience we call one kind *positive*, and the other *negative*.

THE TWO KINDS OF ELECTRICITY THAT WE FIND IN THE ATOM

Now, the reason for distinguishing these two kinds, and for giving them these names, lies in their relation to each other. Positive and negative electricity attract each other; but two negative electricities or two positive electricities will repel each other. Now, all the electrons we have been talking about—these tiny but wonderful things which fly about in the atomic system as the planets do in the solar system—are of the kind called negative. They are often described as *negative electrons*. Similar kinds of electricity repel each other, and when we find a number of electric particles or atoms all negative, living together in the same atom, we may be quite certain that, if only we could find it, there must be some positive electricity in the atom which is holding them all together; and that is the case.

We must think of the atom as if it had in the centre a "sun" made of positive electricity—the bond which holds the atom together; and then around this, within its "sphere of influence," as we say, there are a number of electrons or particles of negative electricity in ceaseless movement within the atom, but controlled by the core, or centre, of positive electricity.

AN ELECTRON COULD GO ROUND THE WORLD IN A MOMENT

This, then, is the system that makes the atom, and the parallel between an atom and the solar system is not only beautiful and interesting, but there is general agreement that it is also the most helpful and instructive way of looking at the atom that we can imagine at present.

Of course, we must ask ourselves what these positive and negative electricities that we talk about really are, and that is the question of questions for this branch of science to-day.

About positive electricity we know scarcely anything, but in various ways it has been possible, especially during the last eight years, to learn a great deal about negative electricity. We know that the electrons move out of the atom at a rate of about 30,000 miles a second, which means that it moves so fast that it could travel round the earth in a single moment; we know that because they are electric they put the air around them into a peculiar electric state; we can weigh them, in a sense, and we can study the force with which they repel each other.

We are also beginning to get some notion of the numbers of them that exist in atoms of various kinds—comparatively few in a small atom like that of hydrogen, but vastly larger numbers in a big atom like that of radium. We shall not quote here the numbers that have been suggested, but may merely say that they run to several hundreds in the case of the hydrogen atom, and tens of thousands in the case of atoms like those of mercury or radium. This subject, however, is being worked at hard just now, and it will be wiser if we are not too sure at present.

THE WAY IN WHICH WE ARE BEGINNING TO FIND OUT ABOUT THE EARTH

It is specially interesting to learn that the study of electrons helps us to understand why it is that certain kinds of atoms exist and not other kinds; why there are about eighty elements and not, say, 80,000; why the elements run in groups; why iodine is like fluorine in many respects, though they are so different in others, and so on.

Thirty years ago there was nothing to be said except simply that there were so many elements with such and such properties. No one could say *why* there should be these elements and not others; nor why oxygen should have the properties of oxygen and gold the properties of gold. These are great questions which we must be able to answer if ever we are to understand fully the story of the earth; and they are now beginning to be answered by the new discoveries regarding the nature of matter. Thirty years ago we thought that in finding the atom we had finished. Now we see that in finding the atom we have only just begun.

But we must not leave this part of our story without trying to understand what it really means, which is that big and little are only ways of talking, and really do not mean very much. Anything that is bigger than ourselves we call big, and anything that is smaller we call small; or anything that we can see without trouble we call big, and anything too small to see with our unaided eyes we call small.

BIG WORLDS AND LITTLE WORLDS AND WORLDS WITHIN WORLDS

But this is making us and our eyes the measure of all things, and we have no right to do that. Really there are worlds within worlds.

There is the familiar world that we see around us. The earth is in the middle of it, as we think, and everything that is in the sky goes round it. But really nothing goes round it but the little moon, and our world is only a part of a system with the sun as its centre. This solar system, then, is another world outside our world, but the solar system itself is only a part of the world of stars.

Or, instead of looking outwards, look inwards. We have invented an instrument called the microscope, and have found a world of little living things which no one had dreamed of, yet quite as lively and real and wonderful a world as the one we all know. Then, by the aid of chemistry, we can pierce to a world smaller still, though just as wonderful. We pick up the bodies of living things, and water and stones and dust, and we find them all made of atoms. We thought that *that* was the smallest world that could be.

WE KNOW LESS ABOUT AN ATOM THAN WE KNOW ABOUT A STAR

But each atom is a world of its own. We actually know less about the wonders of the world or system we call an atom, about its balance and history and structure, than we do about the world or system we call the solar system. We think that we have found in electricity the real first stuff out of which matter is made. But electricity is, perhaps, only a part of a still deeper world, the world of ether, which lies beyond.

Yet some people say that when science begins to dissect and analyse Nature, all the wonder and beauty of things is destroyed. How little they know!

The next story of the Earth is on page 1665.

POETRY OF JOY AND SADNESS

EVEN reading without being careful to think over what one has read, it is not possible to have read as many poems as we have now printed without noticing that the feelings expressed in them, and the feelings they have awakened in us, are constantly changing. Nothing that is written touches our feelings or emotions so quickly and so deeply as poetry does, and below we read of some of the many different ways in which it can affect us.

OUR FEELINGS IN POETRY

CONTINUED FROM PAGE 1492

To make his fellowmen feel something of the joy that may be filling his own heart is one of the greatest things the poet can do. Indeed, all great things in literature have been accomplished by men and women giving to the world a powerful impression of their own inner thoughts, feelings, and experiences.

We are all moving through life to the Life that is beyond—our earthly pilgrimage, it is called; and nothing can be more interesting to us than to know what is happening to our fellow-pilgrims, what they think of the great journey; and those of them who have the power to tell us are our great poets and philosophers.

But joy is not the only feeling the poet experiences. Far from it. Sadness is often the feeling that comes to the thoughtful mind; joy more often keeps company with the thoughtless. The poet knows all our feelings: joy, sadness, hope, and the many different shades of these. We may call them "moods," meaning the frame of mind we may be in at one time, which will be quite different from our feeling at another. Poetry is the only lasting way of expressing these varying feelings so that they may be recalled long after they have passed away.

Now, this power to enter into the moods of others, and to draw hope from the words of the poets, is a great and precious thing. Hence, the writers whose poems have most of human feeling in them are most likely to be of service to mankind. But it must not be supposed that we can profit by reading only what we may call the poetry of joy—that is to say, cheerful poems. Sorrow and sadness are quite as important to make our life complete; nay, they are needful to make us truly happy. We could not know true joy if we never knew what it was to be sad. So the poet must at times sing songs of sadness. Milton, as we shall learn later, wrote two fine poems—they are quite short, and can each be read in ten or fifteen minutes—the one entitled "L'Allegro" and the other "Il Penseroso."

The titles are taken from the Italian, and mean the cheerful and the pensive. That is to say, the first is a poem written, as it were, by a cheerful man, and the second by a melancholy man. The cheerful man looks at Nature and the world with the singing of the lark, and the melancholy man with the notes of the nightingale.

The one begins, "Hence, loathèd Melancholy!" and the other, "Hence, vain deluding Joys!" Yet both are the work of the same poet, and convey feelings that must come to all of us in our different moods. The use of sadness in poetry is to purify our thoughts, to balance our minds; for if we were always laughing with the jesters we should in time become incapable of earnest thought, and, as Longfellow tells us:

> Life is real, life is earnest,
> And the grave is not its goal.

From a wise mixture of joy and sadness springs hope, and so we are enabled to endure the trials of life. English poetry is full of hope, because it is healthy, sane, and, as we have seen, in love with the fresh, green country.

OLD FOLKS AT HOME

This well-known song by Stephen Collins Foster is a great favourite all over our land, and expresses the feelings of a Southern darkey after the desolation of the Civil War had swept the South bare, and thrown the darkeys out into the world to depend upon their own resources.

WAY down upon de Swanee Ribber,
Far, far away,
Dere's wha my heart is turning ebber,
Dere's wha de old folks stay.
All up and down de whole creation
Sadly I roam,
Still longing for de old plantation,
And for de old folks at home.

All de world am sad and dreary,
Ebery where I roam;
Oh, darkeys, how my heart grows weary,
Far from de old folks at home!

All round de little farm I wandered
When I was young,
Den many happy days I squandered,
Many de song I sung.
When I was playing wid my brudder
Happy was I;
Oh, take me to my kind old mudder!
Dere let me live and die.

One little hut among de bushes,
One dat I love,
Still sadly to my memory rushes,
No matter where I rove.
When will I see de bees a-humming
All round de comb?
When will I hear de banjo tumming
Down in my good old home?

All de world am sad and dreary,
Ebery where I roam;
Oh, darkeys, how my heart grows weary,
Far from de old folks at home.

OLD IRONSIDES

AY, tear her tattered ensign down!
Long has it waved on high,
And many an eye has danced to see
That banner in the sky;
Beneath it rung the battle shout,
And burst the cannon's roar;—
The meteor of the ocean air
Shall sweep the clouds no more.

Her deck, once red with heroes' blood,
Where knelt the vanquished foe,
When winds were hurrying o'er the flood,
And waves were white below,
No more shall feel the victor's tread,
Or know the conquered knee;
The harpies of the shore shall pluck
The eagle of the sea!

Oh, better that her shattered hulk
Should sink beneath the wave!
Her thunders shook the mighty deep,
And there should be her grave;
Nail to the mast her holy flag,
Set every threadbare sail,
And give her to the god of storms,
The lightning, and the gale!

— OLIVER WENDELL HOLMES.

A VALEDICTION

Many good-bye poems have been written in honour of dear ones who are temporarily separated from us, but none excels "A Valediction" by Elizabeth Barrett Browning.

GOD be with thee, my beloved,—God be with thee!
Else alone thou goest forth,
Thy face unto the north,
Moor and pleasance all around thee and beneath thee,
Looking equal in one snow;
While I who try to reach thee,
Vainly follow, vainly follow,
With the farewell and the hollo,
And cannot reach thee so.
Alas, I can but teach thee.
God be with thee, my beloved,—God be with thee.

. . . . . .

Can I love thee, my beloved, can I love thee?
And is this like love, to stand
With no help in my hand,
When strong as death I fain would watch above thee?
My love-kiss can deny
No tear that falls beneath it;
Mine oath of love can swear thee
From no ill that comes near thee,—
And thou diest while I breathe it,
And I—I can but die!
May God love thee, my beloved,—may God love thee.

MOTHER

It cannot be doubted that Lord Alfred Tennyson's own mother sat for this beautiful picture of motherhood taken from "The Princess."

ONE
Not learned, save in gracious household ways;
Not perfect, nay, but full of tender wants;
No angel, but a dearer being, all dipt
In angel instincts, breathing Paradise,
Interpreter between the gods and man,
Who looked all native to her place, and yet
On tiptoe seemed to touch upon a sphere
Too gross to tread, and all male minds perforce
Swayed to her from their orbits as they moved,
And girdled her with music. Happy he
With such a mother! faith in womankind
Beats with his blood, and trust in all things high
Comes easy to him, and though he trip and fall
He shall not blind his soul with clay.

THE SWEETEST LIVES

Elizabeth Barrett Browning has contributed many beautiful poems to our BOOK OF POETRY but none holds a truer lesson than "The Sweetest Lives."

THE sweetest lives are those to duty wed,
Whose deeds, both great and small,
Are close-knit strands of an unbroken thread
Where love ennobles all.
The world may sound no trumpets, ring no bells;
The Book of Life the shining record tells.
Thy love shall chant its own beatitudes
After its own life-working. A child's kiss
Set on thy sighing lips shall make thee glad;
A poor man served by thee shall make thee rich;
A sick man helped by thee shall make thee strong;
Thou shalt be served thyself by every sense
Of service which thou renderest.

NATHAN HALE

Washington needed information about the British Army. Young Captain Nathan Hale volunteered to get this. He was taken by the enemy and hanged as a spy. He died regretting that he had but one life to give for his country. The poem below was written by Francis Miles Finch.

To drum-beat and heart-beat,
A soldier marches by:
There is colour in his cheek,
There is courage in his eye,
Yet to drum-beat and heart-beat
In a moment he must die.

By starlight and moonlight,
He seeks the Briton's camp;
He hears the rustling flag,
And the armèd sentry's tramp;
And the starlight and moonlight
His silent wanderings lamp.

With slow tread and still tread,
He scans the tented line;
And he counts the battery guns
By the gaunt and shadowy pine;
And his slow tread and still tread
Gives no warning sign.

The dark wave, the plumed wave,
It meets his eager glance;
And it sparkles 'neath the stars,
Like the glimmer of a lance—
A dark wave, a plumed wave,
On an emerald expanse.

A sharp clang, a steel clang,
And terror in the sound!
For the sentry, falcon-eyed,
In the camp a spy hath found;
With a sharp clang, a steel clang,
The patriot is bound.

With calm brow, steady brow,
He listens to his doom;
In his look there is no fear,
Nor a shadow-trace of gloom;
But with calm brow and steady brow
He robes him for the tomb.

In the long night, the still night,
He kneels upon the sod;
And the brutal guards withhold
E'en the solemn Word of God!
In the long night, the still night,
He walks where Christ hath trod.

'Neath the blue morn, the sunny morn,
He dies upon the tree;
And he mourns that he can lose
But one life for Liberty;
And in the blue morn, the sunny morn,
His spirit-wings are free.

But his last words, his message-words,
They burn, lest friendly eye
Should read how proud and calm
A patriot could die,
With his last words, his dying words,
A soldier's battle-cry.

From the Fame-leaf and Angel-leaf,
From monument and urn,
The sad of earth, the glad of heaven,
His tragic fate shall learn;
And on Fame-leaf and Angel-leaf
The name of HALE shall burn.

HASTE NOT! REST NOT!

"Haste Not! Rest Not!" was written by the great dramatist, Johann W. Von Goethe, who is known to the English reading public principally through the grand opera, "Faust."

WITHOUT haste! without rest!
Bind the motto to thy breast;
Bear it with thee as a spell;
Storm or sunshine, guard it well!
Heed not flowers that round thee bloom,
Bear it onward to the tomb.

Haste not! Let no thoughtless deed
Mar for aye the spirit's speed!
Ponder well, and know the right,
Onward then, with all thy might!
Haste not! years can ne'er atone
For one reckless action done.

Rest not! Life is sweeping by,
Go and dare, before you die;
Something mighty and sublime
Leave behind to conquer time!
Glorious 'tis to live for aye,
When these forms have passed away.

Haste not! rest not! calmly wait;
Meekly bear the storms of fate!
Duty be thy polar guide;—
Do the right, whate'er betide!
Haste not! rest not! conflicts past,
God shall crown thy work at last.

SONG OF MARION'S MEN

William Cullen Bryant wrote the following in memory of Marion and his brave men, who waged harassing guerilla warfare against the British army during the Revolution.

OUR band is few, but true and tried,
Our leader frank and bold;
The British soldier trembles
When Marion's name is told.
Our fortress is the good greenwood,
Our tent the cypress-tree;
We know the forest round us,
As seamen know the sea.
We know its walls of thorny vines,
Its glades of reedy grass,
Its safe and silent islands
Within the dark morass.

Woe to the English soldiery,
That little dream us near!
On them shall light at midnight
A strange and sudden fear:
When, waking to their tents on fire,
They grasp their arms in vain,
And they who stand to face us
Are beat to earth again.
And they who fly in terror deem
A mighty host behind,

And hear the tramp of thousands
Upon the hollow wind.

Then sweet the hour that brings release
From danger and from toil;
We talk the battle over,
And share the battle's spoil.
The woodland rings with laugh and shout,
As if a hunt were up,
And woodland flowers are gathered
To crown the soldier's cup.
With merry songs we mock the wind
That in the pine-top grieves,
And slumber long and sweetly
On beds of oaken leaves.

Well knows the fair and friendly moon
The band that Marion leads —
The glitter of their rifles,
The scampering of their steeds.
'Tis life to guide the fiery barb
Across the moonlight plain;
'Tis life to feel the night-wind
That lifts his tossing mane.
A moment in the British camp —
A moment — and away
Back to the pathless forest,
Before the peep of day.

Grave men there are by broad Santee,
Grave men with hoary hairs;
Their hearts are all with Marion,
For Marion are their prayers.
And lovely ladies greet our band
With kindliest welcoming,
With smiles like those of summer,
And tears like those of spring.
For them we wear these trusty arms,
And lay them down no more
Till we have driven the Briton,
For ever, from our shore.

MY HEART'S IN THE HIGHLANDS

We have many poems by Robert Burns in our Book of Poetry, but none is more widely known and loved than "My Heart's in the Highlands A-Chasing the Deer."

My heart's in the Highlands, my heart is not here;
My heart's in the Highlands a-chasing the deer;
Chasing the wild deer, and following the roe,
My heart's in the Highlands, wherever I go.
Farewell to the Highlands, farewell to the North,
The birthplace of valour, the country of worth;
Wherever I wander, wherever I rove,
The hills of the Highlands for ever I love.

Farewell to the mountains high covered with snow;
Farewell to the straths and the green valleys below;
Farewell to the forests and wild-hanging woods;
Farewell to the torrents and loud-pouring floods.

My heart's in the Highlands, my heart is not here;
My heart's in the Highlands a-chasing the deer;
Chasing the wild deer, and following the roe,
My heart's in the Highlands, wherever I go.

EVENING HYMN

John Keble was an English clergyman and he wrote many beautiful poems. Among them is the "Evening Hymn," which we quote here.

Sun of my soul, thou Saviour dear,
It is not night if thou be near;
Oh, may no earth-born cloud arise
To hide thee from thy servant's eyes.

When the soft dews of kindly sleep
My weary eyelids gently steep,
Be my last thought, how sweet to rest
Forever on my Saviour's breast.

Abide with me from morn till eve,
For without thee I cannot live;
Abide with me when night is nigh,
For without thee I dare not die.

If some poor wandering child of thine
Has spurned to-day the Voice divine,
Now, Lord, the gracious work begin:
Let him no more lie down in sin.

Watch by the sick; enrich the poor
With blessings from thy boundless store;
Be every mourner's sleep to-night
Like infant's slumbers, pure and light.

Come near and bless us when we wake,
Ere through the world our way we take,
Till in the ocean of thy love
We lose ourselves in heaven above.

HYMN OF CONCORD

This poem was written by Ralph Waldo Emerson to be sung at the completion of the Concord Monument, April 19, 1836.

By the rude bridge that arched the flood,
Their flag to April's breeze unfurled,
Here once the embattled farmers stood,
And fired the shot heard round the world.

The foe long since in silence slept;
Alike the conqueror silent sleeps;
And Time the ruined bridge has swept
Down the dark stream which seaward creeps.

On this green bank, by this soft stream,
We set to-day a votive stone;
That memory may their deed redeem,
When, like our sires, our sons are gone.

Spirit, that made those heroes dare
To die, or leave their children free,
Bid Time and Nature gently spare
The shaft we raise to them and thee.

THE REAPER

This is one of the most beautiful of the many poems by William Wordsworth. It shows how the imagination of the poet may be strangely stirred by so simple an incident as a woman reaping in the field and singing while she works.

Behold her, single in the field,
Yon solitary Highland lass!
Reaping and singing by herself;
Stop here, or gently pass!
Alone she cuts and binds the grain,
And sings a melancholy strain;
O, listen! for the vale profound
Is overflowing with the sound.

No nightingale did ever chaunt
More welcome notes to weary bands
Of travellers in some shady haunt
Among Arabian sands:
No sweeter voice was ever heard
In spring-time from the cuckoo-bird,
Breaking the silence of the seas
Among the farthest Hebrides.

Will no one tell me what she sings?
Perhaps the plaintive numbers flow
For old, unhappy, far-off things,
And battles long ago:
Or is it some more humble lay,
Familiar matter of to-day?
Some natural sorrow, loss, or pain,
That has been, and may be again?

Whate'er the theme, the maiden sang
As if her song could have no ending;
I saw her singing at her work,
And o'er the sickle bending.
I listen'd till I had my fill;
And as I mounted up the hill
The music in my heart I bore
Long after it was heard no more.

CROSSING THE BAR

After Browning's "Prospice," "The Crossing of the Bar," by Alfred Tennyson, is the noblest death-song ever written. It is interesting to compare the differing emotions with which great men have faced the mystery of death, as shown forth in such poems as these and Robert Louis Stevenson's "Epitaph."

Sunset and evening star,
And one clear call for me!
And may there be no moaning of the bar,
When I put out to sea.

But such a tide as moving seems asleep,
Too full for sound and foam,
When that which drew from out the boundless deep
Turns again home.

Twilight and evening bell,
And after that the dark!
And may there be no sadness of farewell,
When I embark.

For tho' from out our bourne of Time and Place
The flood may bear me far,
I hope to see my Pilot face to face
When I have crossed the bar.

IN ABSENCE

All that thou art not, makes not up the sum
Of what thou art, beloved, unto me;
All other voices, wanting thine, are dumb;
All vision, in thine absence, vacancy.

John Banister Tabb.

THE HEATHEN CHINEE

This humorous poem by Bret Harte deals with a phase in the lives of settlers in the great western portion of our Continent.

Which I wish to remark—
And my language is plain—
That for ways that are dark,
And for tricks that are vain,
The heathen Chinee is peculiar,
Which the same I would rise to explain.

Ah Sin was his name,
And I shall not deny
In regard to the same
What that name might imply;
But his smile it was pensive and childlike,
As I frequent remarked to Bill Nye.

It was August the third,
And quite soft was the skies,
Which it might be inferred
That Ah Sin was likewise;
Yet he played it that day upon William
And me in a way I despise.

Which we had a small game,
And Ah Sin took a hand;
It was euchre—the same
He did not understand;
But he smiled as he sat by the table
With the smile that was childlike and bland.

Yet the cards they were stocked
In a way that I grieve,
And my feelings were shocked
At the state of Nye's sleeve,
Which was stuffed full of aces and bowers,
And the same with intent to deceive.

But the hands that were played
By that heathen Chinee,
And the points that he made
Were quite frightful to see,
Till at last he put down a right bower,
Which the same Nye had dealt unto me.

Then I looked up at Nye,
And he gazed upon me;
And he rose with a sigh,
And said: "Can this be?
We are ruined by Chinese cheap labour";
And he went for that heathen Chinee.

In the scene that ensued
I did not take a hand,
But the floor it was strewed,
Like the leaves on the strand,
With the cards that Ah Sin had been hiding
In the game "he did not understand."

In his sleeves, which were long,
He had twenty-four jacks,
Which was coming it strong,
Yet I state but the facts;
And we found on his nails, which were taper,
What is frequent in tapers—that's wax.

Which is why I remark—
And my language is plain—
That for ways that are dark,
And for tricks that are vain,
The heathen Chinee is peculiar,
Which the same I am free to maintain.

THE WALRUS AND THE CARPENTER BY LEWIS CARROLL

THE sun was shining on the sea,
Shining with all his might;
He did his very best to make
The billows smooth and bright—
And this was odd, because it was
The middle of the night.

The moon was shining sulkily,
Because she thought the sun
Had got no business to be there
After the day was done—
"It's very rude of him," she said,
"To come and spoil the fun!"

The sea was wet as wet could be,
The sands were dry as dry.
You could not see a cloud because
No cloud was in the sky;
No birds were flying overhead—
There were no birds to fly.

The Walrus and the Carpenter
Were walking close at hand;
They wept like anything to see
Such quantities of sand:
"If this were only cleared away,"
They said, "it *would* be grand!"

"If seven maids with seven mops
Swept it for half a year,
Do you suppose," the Walrus said,
"That they could get it clear?"
"I doubt it," said the Carpenter,
And shed a bitter tear.

"O Oysters, come and walk with us!"
The Walrus did beseech.
"A pleasant walk, a pleasant talk,
Along the briny beach:
We cannot do with more than four,
To give a hand to each."

The eldest Oyster looked at him,
But never a word he said:
The eldest Oyster winked his eye,
And shook his heavy head—
Meaning to say he did not choose
To leave his oyster-bed.

But four young Oysters hurried up,
All eager for the treat:
Their coats were brushed, their faces washed,
Their shoes were clean and neat—
And this was odd, because, you know,
They hadn't any feet.

Four other Oysters followed them,
And yet another four;
And thick and fast they came at last,
And more, and more, and more—
All hopping through the frothy waves,
And scrambling to the shore.

S. C. BUNNELL

The Walrus and the Carpenter
Walked on a mile or so,
And then they rested on a rock
Conveniently low :
And all the little Oysters stood
And waited in a row.

" The time has come," the Walrus said,
" To talk of many things :
Of shoes — and ships — and sealing-wax—
Of cabbages—and kings—
And why the sea is boiling hot—
And whether pigs have wings."

" But wait a bit," the Oysters cried,
" Before we have our chat ;
For some of us are out of breath,
And all of us are fat ! "
" No hurry ! " said the Carpenter.
They thanked him much for that.

" A loaf of bread," the Walrus said,
" Is what we chiefly need :
Pepper and vinegar besides
Are very good indeed
Now, if you're ready, Oysters dear,
We can begin to feed."

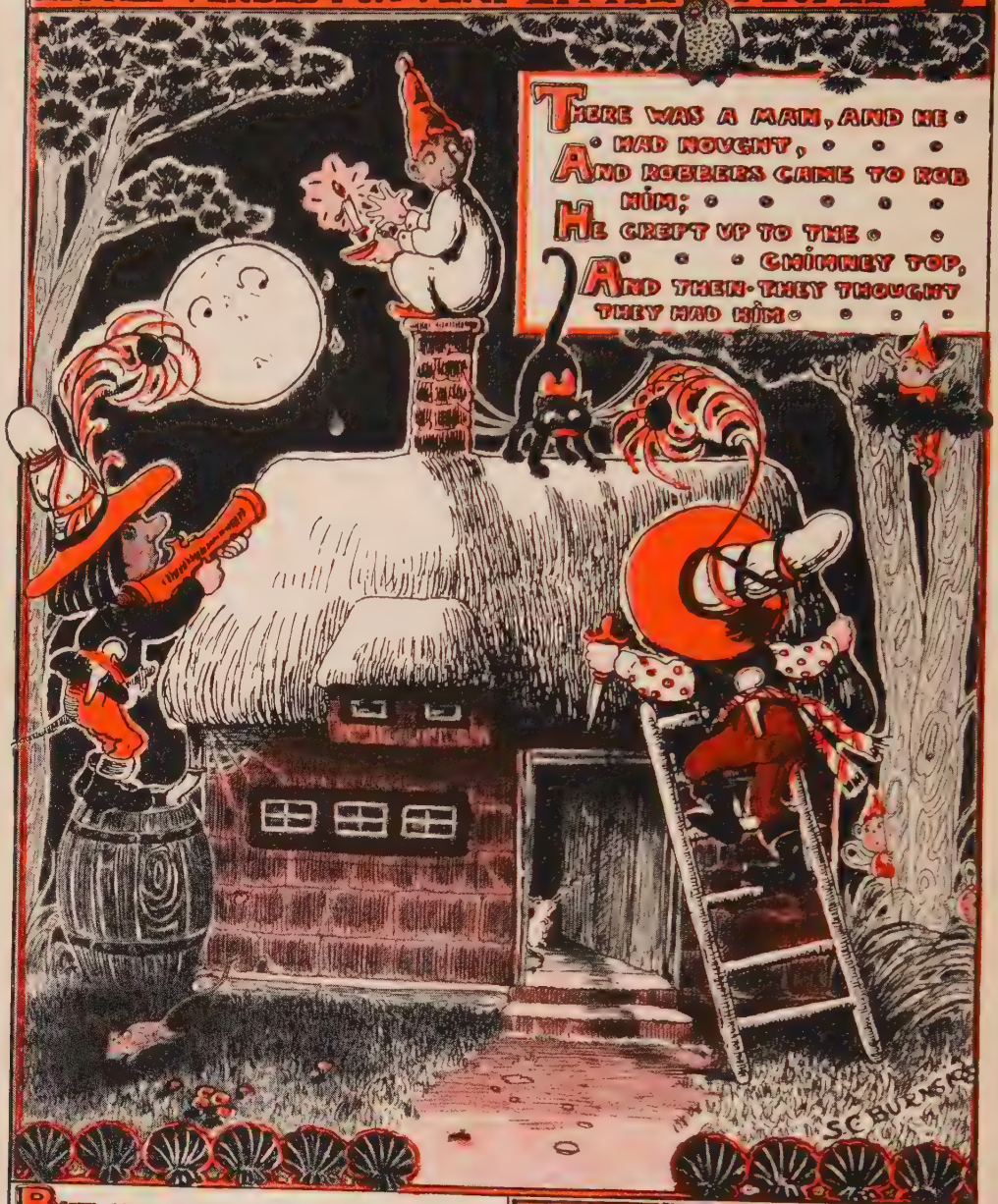
" But not on us ! " the Oysters cried,
Turning a little blue
" After such kindness, that would be
A dismal thing to do ! "
" The night is fine," the Walrus said,
" Do you admire the view ?

" It was so kind of you to come !
And you are very nice ! "
The Carpenter said nothing but
" Cut me another slice.
I wish you were not quite so deaf—
I've had to ask you twice ! "

" It seems a shame," the Walrus said,
" To play them such a trick,
After we've brought them out so far,
And made them trot so quick ! "
The Carpenter said nothing but
" The butter's spread too thick ! "

" I weep for you," the Walrus said ;
" I deeply sympathise."
With sobs and tears he sorted out
Those of the largest size,
Holding his pocket-handkerchief
Before his streaming eyes.

" O Oysters," said the Carpenter,
" You've had a pleasant run !
Shall we be trotting home again ? "
But answer came there none—
And this was scarcely odd, because
They'd eaten every one.



But he got down on
t'other side,
And then they could not
find him,
He ran fourteen miles
in fifteen days,
And never looked
behind him.

HERE'S A POOR WIDOW FROM BABYLON
WITH SIX POOR CHILDREN ALL ALONE :
ONE CAN BAKE AND ONE CAN BREW,
ONE CAN SHAPE, AND ONE CAN SEW,
ONE CAN SIT BY THE FIRE AND SPIN ,
ONE CAN BAKE A CAKE FOR A KING.
COME CHOOSE YOU EAST. . . .
. . . COME CHOOSE YOU WEST,
COME CHOOSE YOU THE ONE .
. . THAT YOU LOVE THE BEST.

WHEN GOOD KING ARTHUR RULED THIS LAND

When good King Arthur ruled this land
He was a goodly king :
He stole three pecks of barley meal,
To make a bag pudding.

A rare pudding the King did make,
And stuffed it well with plums ;
And in it put such lumps of fat,
As big as my two thumbs.

The King and Queen did eat thereof,
And noblemen beside,
And what they could not eat that night,
The Queen next morning fried.

COCK A DOODLE DOO!
MY DAME HAS LOST HER SHOE

Cock a doodle doo!
My dame has lost her shoe;
My master's lost his fiddling-stick,
And don't know what to do.

Cock a doodle doo!
What is my dame to do?
Till master finds his fiddling-stick,
She'll dance without her shoe.

Cock a doodle doo!
My dame has lost her shoe,
And master's found his fiddling-stick
Sing doodle doodle doo!

Cock a doodle doo!
My dame will dance with you,
While master fiddles his fiddling-stick
For dame and doodle doo.

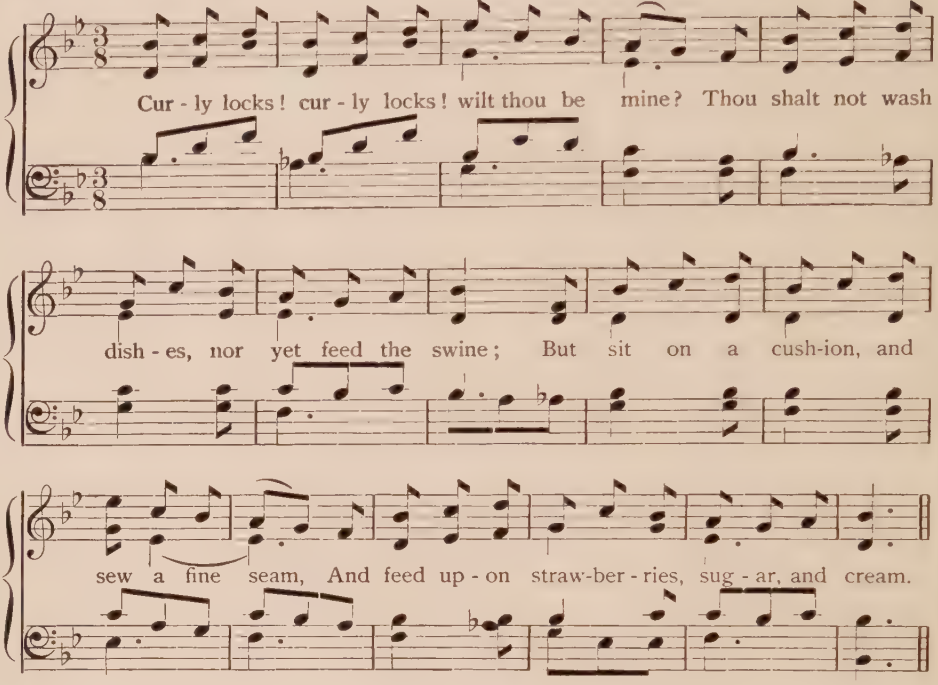
For every evil under the sun,
There is a remedy, or there is none.
If there be one, try and find it;
If there be none, never mind it.

Cross patch,
Draw the latch,
Sit by the fire and spin
Take a cup,
And drink it up,
Then call your neighbours in.

Tell tale tit,
Your tongue shall be slit;
And all the dogs in the town
Shall have a little bit.

A swarm of bees in May
Is worth a load of hay;
A swarm of bees in June
Is worth a silver spoon;
A swarm of bees in July
Is not worth a fly.

"CURLY LOCKS"


Cur - ly locks! cur - ly locks! wilt thou be mine? Thou shalt not wash
dish - es, nor yet feed the swine; But sit on a cush-ion, and
sew a fine seam, And feed up - on straw-ber - ries, sug - ar, and cream.

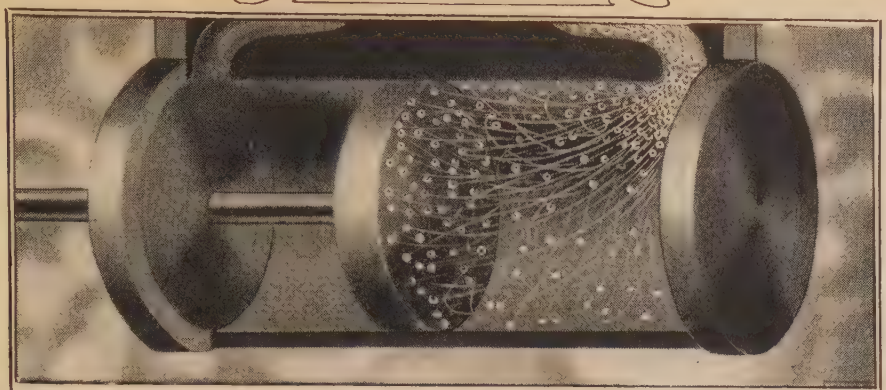
There was a little Rabbit sprig,
Which, being little, was not big;
He always walked upon his feet,
And never fasted when he eat.
When from a place he ran away,
He never at that place did stay;

And when he ran, as I am told,
He ne'er stood still for young or old;
Tho' ne'er instructed by a cat,
He knew a mouse was not a rat.
One day, as I am certified,
He took a whim and fairly died;
And, as I'm told, by men of sense
He never has been walking since.

Bat, bat, come under my hat,
And I'll give you a slice of bacon;
And when I bake,
I'll give you a cake,
If I am not mistaken.

Birch and green holly, boys,
Birch and green holly,
If you get beaten, boys,
'Twill be your own folly.

Come when you're called,
Do what you're bid,
Shut the door after you,
Never be chid.



This shows how steam drives an engine. The steam is made of little specks of gas, which bombard the iron plate of the piston-rod so hard and fast that the rod moves forward and turns the wheels.

WHAT GIVES STEAM ITS POWER?

CONTINUED FROM 1372

THERE is an old Scotch proverb that "mony a mickle maks a muckle," which means that many little things put together make much. The power of steam is a case of this, for it can drive great boats through the water and it can tear up the greatest rocks. Yet all its power is due to the coming together of little units of power.

When we speak of steam, we mean water-vapour—water in the form of gas. This gas is formed under pressure, and has power to expand. It is this expansive power that does the work. Afterwards the gas becomes cool and condensed, so that we can see it, and that is what we call steam. The power of the gas is due to the tiny little molecules of water of which it is made. Each of these is flying about in all directions trying to get loose, and so striking against the sides of whatever hems it in. The force in one of these molecules is very tiny, for the amount of stuff in the molecules is so small. If you had a hammer smaller than you could see, you could not drive in a nail with it. But as there are billions of these little hammers flying about in the gas, they are able to do all the work that "steam" does.

WHAT IS THE DIFFERENCE BETWEEN HARD WATER AND SOFT WATER?

The difference between these two kinds of water is that the hard water contains certain salts not found in soft water. These salts are almost always salts of lime, which the water has picked up from the earth as it passed through it. So we understand that they are not found in rain-water, which is therefore soft. Hard water is very good to drink, as a rule, but the only objection to it is that it interferes with the use of soap, so that the water is not good for washing purposes.

When soap is used with hard water a chemical change occurs, so that the soap is turned into something which does not dissolve in water; whereas soap used with soft water produces something which dissolves in the water, and forms a splendid lather, and so is good for washing with. This makes a great deal of difference to poor people, or to anyone who washes clothes at home, because soap used with hard water will not lather and is very nearly all wasted, and things cannot be made clean. We can easily tell whether water is hard or soft by adding soap to it.

CAN WE MAKE HARD WATER SOFT?

If we can get nothing but hard water to wash with, it is necessary to find out some way of making it soft, and there are such ways. Very often the salt which makes the water hard is what is called bicarbonate of lime. This exactly corresponds to the bicarbonate of sodium, which is formed in

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the blood, as we read in another part. Water can carry this salt about, but it cannot carry carbonate of lime, which, like carbonate of sodium, has only one "dose" of carbonic acid in it, and not two.

So the curious thing is that we can make this hard water soft by adding lime to it. What happens is simply that the new lime takes one-half of the carbonic acid from the bicarbonate, so as to form two lots of the single carbonate. The water cannot hold this, so it falls to the bottom, and after that the water is soft. Another way of making such water soft is to boil it. This drives off the second dose of carbonic acid in the bicarbonate, and the single carbonate that is left falls to the bottom, and so the water is softened. Occasionally the hardness of water is due to another lime salt which is not changed when the water is boiled. This kind of hardness is called *permanent*, while the other is called *temporary*.

ARE DIAMONDS REALLY VALUABLE?

The time will come when we are more careful than at present how we use the word "valuable." A great Englishman, John Ruskin, reminded us that "valuable" comes from a word meaning to be strong and well, and we should only use the word valuable really for things that make us strong and well and happy—for things that really serve our lives. Properly speaking, then, common iron, or still commoner air and water—without which we cannot live—are a million times more valuable than diamonds. For the only real value in diamonds is, first, that they are good for cutting glass; and, second, that they reflect light very brilliantly from their surfaces, and so are pretty.

Of course, the biggest diamond in the world is nothing like so beautiful as a rosebud or a violet; but, still, anything that reflects light brilliantly and glitters is rather pretty, especially to very small children. So diamonds are not really very valuable, but they are costly. People think these two words mean the same thing, but no one who thinks so has yet begun to be wise or to know what wisdom is. Wars are costly, but not valuable; air and light are not costly, but they are more valuable than all the jewels and gold in the world.

WHY ARE DIAMONDS COSTLY?

This is easily answered. First, diamonds are costly because they are rare. Any but the smallest diamonds are very rare indeed. They are only found in certain parts of the world, only very few of them are found there, and they take a lot of finding. Of course, there are many other rare things that are quite valueless, just as diamonds are almost valueless. But people do not want these other things, and so they are not costly. People *do* want diamonds, and so they are costly. The interesting question now is: Why do people want these things? Perhaps one person in a hundred who buys diamonds wants them because they are beautiful; he buys them for the same reason as he buys a rose or looks at the moon, or listens to beautiful singing. But many people who buy them, buy them to show that they have a lot of money.

WHY DO PEOPLE WEAR DIAMONDS?

Some people wear diamonds because diamonds are beautiful, and because they like beautiful things, but other people wear them for less worthy reasons. Of course, if one had a lot of money, one could put it into the form of a banknote for $20,000, and wear it round one's neck. But people would say that was vulgar. Only if you buy diamonds with it, you can wear them round your neck; if it is in the morning, people will still say you are vulgar; if it is in the evening, they will say: "Look at those diamonds. What a lot of money that woman must have!" Or sometimes they say: "What a lot of money she must be worth!" They cannot say anything worse about her than that, for if she is only worth money, she is worthless. That, then, is why diamonds are costly, because they are one of the best ways of showing to all the world that you have a lot of money. Some day, when we have learnt to make diamonds as big as cocoanuts, we shall find out how many people love them because they are beautiful, as then everyone can have them who likes them. They are only made of carbon, and carbon itself is dirt cheap.

WHAT MAKES GOLD MORE VALUABLE THAN SILVER?

This is another question where we should use the word costly instead of valuable, for I am not sure that gold is really more valuable than silver. Silver

is at least as beautiful. Silver, when it has a little of something else added to it, wears better; certain forms of silver are very valuable as medicine. Gold, on the other hand, is valuable for some purposes, because it can be hammered into very thin sheets. At any rate, there is no doubt that gold is more costly than silver, and the reason is that it is very much rarer. There is probably much less of it in the world.

If, one day, we should discover a great mountain made of solid gold, then gold would become much less costly than silver; and if the mountain were very big, no doubt we should make pennies of gold. That shows the difference between cost and value, for if a thing has real value, such as noble music or wheat, then the discovery of more of it is simply so much more real wealth in the world. My loaf is worth no less to me because you have a loaf too; but the more gold there is in the world, the less can I do with the gold I have. These things are quite simple—any child can understand them—and when all grown-up people understand them the earth will be a new place.

IS GOLD POISON?

Gold is not poison to men's bodies. If you were even to swallow a gold eagle it would no doubt hurt you, but it would not poison you. But gold may be—though it need not be—a poison to men's souls. It is the love of gold, just because gold gives us the power of doing things we like, that makes most wars, for instance. It makes men cheat and thieve and murder, and hate the good and love the bad. There are four lines of poetry, written by the greatest poet of all time, which I want to quote to you. They are in a play by Shakespeare. The man who speaks is very unhappy, and he has bought some poison in order to kill himself. Though it is against the law to sell poison, yet the man who has it is very poor, and he has taken Romeo's gold for it. Then Romeo says:

> There is thy gold; worse poison to men's souls,
> Doing more murders in this loathsome world,
> Than these poor compounds that thou may'st not sell:
> I sell thee poison, thou hast sold me none.

There are people who will say that the answer to this question is nonsense, but there are others, perhaps, who may think that it is worth its weight not in gold, but in life.

HOW DOES GOLD COME INTO THE EARTH?

Not so long ago people would have said, in answering this question, that the gold of the earth must have been there as gold in the stuff of which the earth was made, since it was believed that atoms of gold, like atoms of anything else, had always been as they are now from the first.

But no one would now return that answer to this question. We must believe that the gold now found in the earth has been formed there, probably very long ago, by the breaking down of some kind of atoms even larger and heavier than those of gold. No one can yet say what these atoms were, though if the question had been asked about some other elements instead of gold—such, for instance, as lead—the answer would probably be that the lead now found in the earth had been formed from the breaking down of atoms of radium. This question about the history of gold and of many other elements will probably be answered before long.

WHAT MAKES SOME THINGS SMELL AND OTHERS NOT?

We say that we smell things at a distance, but what we actually smell is always something that enters the nose, though it may have been carried from a distance. So if anything is to have a smell, first of all it must give off from itself something or other which can reach the nose; and, secondly, that something must have the power of influencing the nerves of smell. We cannot smell pure air or water even if we sniff it up the nose, because, though these things touch the ends of the nerves of smell, they have no effect on those nerves.

As a matter of fact, most things do give off something from themselves, even such things as metals; and if we put our nose very close, we may detect some smell, just as we may in wood or leather. But though many more things than we think have some smell, yet things vary very much. A little speck of the stuff called musk will give a powerful scent to a room for years—a fact which shows, among other things, what an amazing number of atoms there must be in the tiniest speck of

anything, since, after long periods of time, there seems to be just as much musk there as ever, though it has been filling the room with its scent all the time, and this means that it has been giving off atoms of itself to the air of the room.

WHY DO THINGS SMELL DIFFERENTLY?

Difference of smell depends upon the difference in the way things are made, and that is about all we can say. Still, we can, to some extent, find that there is some rule in the way things smell. For instance, very often we notice that numbers of plants belonging to a particular family of plants have odours with a family resemblance between them. Then we notice that there is a certain resemblance in the smells of a great number of different compounds, all of which contain the element sulphur. This is a very notable thing to remember about sulphur, for practically all its compounds have a disagreeable smell.

The compound of sulphur and oxygen, which is the gas made when sulphur is burnt, is very unpleasant; so is the compound of sulphur and hydrogen, H_2S, which corresponds to the compound of oxygen and hydrogen, H_2O. This sulphuretted hydrogen, as it is called, smells exactly like rotten eggs, for the very good reason that it is sulphuretted hydrogen which is formed in rotten eggs and gives them their objectionable smell.

Similarly, many plants make compounds of sulphur which have the same sort of family smell. On the other hand, there are certain oils, produced by plants, that are made of carbon and hydrogen, and are all built up on the same chemical plan. These, which we often call essences, have a certain group or family smell, though they differ very much from each other. So smell, we see, is a sort of chemical sense, and things smell differently because they differ chemically.

WHY DO TREES GROW UPWARD?

The first thing to say in answering this question is, that the whole tree does not grow up. Part of the tree grows downward, and that is the root. Each grows to the place where it can do the work for which it was made. In the seed from which the tree grows, there are certain cells which are meant to form the part of the tree that is to live in the air and the light. Wherever the light is, they grow towards it. On the other hand, there are other cells which grow best in the dark, and which even seem to be affected by the gravitation of the earth, so that they grow best towards the centre of the earth.

It is possible to play tricks with the seed, as, for instance, to turn it upside down; but the rule is that the plant will do its best, by curling round as it grows, to ensure that the *shoots* shall get into the air and the light, and the *roots* shall grow downward. So the tree—and this is true of nearly all plants—has two parts: one that lives in the air, and one that lives in the soil. Neither part could live without the other, and the tree is so made from the first that the right part of it—that which is capable of making leaves—must grow upwards into the light and air; while that part of it which will be capable of sucking up water and salts—and also of holding firm—must grow downwards into the earth.

WHY DOES A FACE IN A MIRROR SEEM CROOKED TO A PERSON STANDING BY?

We think that the two sides of our faces are just like each other, but every clever photographer knows that they are not. Ordinarily we notice nothing, but when we see anyone's face reflected in a mirror, then we see the left side of his face as if it were the right, and the right as if it were the left; and as our eye is accustomed to the other thing, his face looks crooked. If you had never seen the person before, you would notice nothing. You have never seen your own face except in a mirror, and if now it were possible for you to see your face as everyone else sees it, your face would look as crooked to you as the faces of your friends look when they are seen in a mirror. Of course, if the two sides of the face were exactly alike, the face would look just the same, whether seen in a mirror or directly.

ARE THINGS IN MID-AIR AFFECTED BY THE MOVEMENT OF THE EARTH?

Certainly they are; the air goes round with the earth, just as the seas do, and everything that is swimming in it—birds, balloons, or anything else—goes round too, just as the fishes do in the sea. If this were not so, when we went up in a balloon, the air would rush past us as it was whirled round with the earth, at the

rate of hundreds of miles an hour. It would be the highest wind we were ever in, and, as we looked down from the balloon, we should see the earth rolling past beneath us; but, of course, that does not happen. Everything in the air shares its movement, and moves with it, except in so far as it has some power of movement of its own, like an airship or that best of airships, a bird.

WHY IS THE WORLD LIGHT WHEN THE SUN IS BEHIND DARK CLOUDS?

It depends how dark the clouds are. If the moon passes directly between us and the sun, the earth becomes as dark as night because the moon is quite opaque, which means that no light can pass through it at all. But when it is only clouds that are between us and the sun, a good deal of light always gets through them, so long as they are real, clean, water clouds. Browning, the great English poet, says:

A sun will pierce
The thickest cloud earth ever stretched.

But sometimes in great cities, and especially in London, unnatural clouds are made, filled with smoke and dirt—mostly tiny specks of coal which have been sent up the chimney. These are the really dark clouds, full of solid black dirt, and there are times when they make the face of London darker than it ever is during a summer night. The coal was made by the sunlight of past ages, and when sent into the air it stops the sunlight that has travelled such a long way from the sun, so quickly and surely to serve people. It has 93,000,000 miles to come, and just at the last half mile or so it is stopped; is this not foolish? And people actually use past sunlight to stop it with!

HOW DOES A COW MAKE ITS MILK?

There are certain parts of the body which exist in order to produce things which the body needs. These are called glands, and they are the chemists of the body. Some glands also exist in order to filter out from the blood things which it does not want. Many glands in the skin do this. Other glands—like one just below and in front of the ear, which gets swollen when we have mumps—make the saliva that pours into our mouths when we eat, and helps us to soften and digest our food.

But there are certain glands which are a thousand times more beautiful and wonderful than any other because they do not exist at all to serve the body to which they belong, but they exist for the sake of other people. They show that Nature is on the side of love, and I think they also show that it is from mothers that love first sprung. When the cow has a calf, the gland called the udder, which makes milk, becomes active, and has the wonderful power of transforming the blood that passes through it into milk for the young calf. The calf's mother eats grass, and turns it into blood; and then the udder turns the blood into milk, which is the best food for calves, as indeed it is also the best food for us. If we could see the udder under the microscope, we should see the little cells near which the blood runs, taking out of the blood everything they need in order to make milk, which passes directly into the calf's stomach—pure, warm, and containing everything the calf needs for its growth.

WHY DOES A CAT ALWAYS FALL ON ITS FEET?

Of course, one answer to this question is that its feet are the best part of it to fall on, but the real puzzle for us is *how* does the cat manage to get its feet lowermost even though it be let fall when it is held by its feet. It has been argued that the cat manages to turn itself by the use of its tail. If that be so, of course, Manx cats, which have no tails, ought not to be able to fall on their feet, but they *are* able. So that that explanation will not do.

All we can say is that somehow, by moving one part of its body on another, the cat controls its fall in order to fall most safely. It is so clever of the cat that we are not yet clever enough to find out how it does it. But we do know that there was no need to call in the tail as an explanation, for men who jump from great heights or who dive from great heights into water have a good deal of power in controlling their bodies as they fall, though every now and again they make a mistake, and one of them is killed. We should not like to see such feats. And also I hope that you will not, after reading this answer, make experiments on your pussy.

WHY HAVE SHIPS A WATER-LINE?

When any ship floats in the water, the line that the surface of the water makes along the ship's side is called the water-line, and the height of this line on the ship's side will depend on the extent to which the ship is loaded. In 1868 an Englishman named Samuel Plimsoll tried to pass a bill dealing with what used to be called "coffin-ships," so called because they were unfit to go to sea, far too heavily loaded for safety, the cargo being heavily insured so that if, as often happened, they went to the bottom, though the crew lost their lives, the owner lost nothing. After a long fight, mainly due to the resistance of bad shipowners, Plimsoll got a law made that a line must be painted on an English ship, and the ship may not be loaded to such an extent as to put that line beneath the water. It is usually known as Plimsoll's line or mark, and must already have saved thousands and thousands of sailors' lives.

WHY DOES STEAM ALWAYS COME WHEN WATER IS HOT?

Water evaporates, as we say, at all temperatures. Whether hot or cold, it slowly leaks away into the air in the form of a gas. As this remains a gas, we do not see anything. But when water is made hot, it very quickly passes into the air as a gas. It passes so quickly that the air cannot hold it all, and it is so much hotter than the air, that it is cooled in the air and turned into drops of liquid water again. It is this little cloud of drops of wet water in the air that we call steam. Water vapour ought not to be called steam. The gas, or vapour, only becomes steam when it ceases to be a gas, and becomes liquid water again.

Thus the name steam-engine is really a very bad one. Steam is what we see escaping from it, but steam—that is to say, a cloud of drops of liquid water—would never drive the engine, as every engineer knows. The kind of thing that does the work he wants is what he calls "dry steam." It is not steam at all, but water vapour. When he first lights his fire, he gets what he calls wet steam—the engine is cold, and it turns the water vapour, which comes from the water as it gets hot, quickly back into steam, or wet water, again; and it is a poor business trying to run an engine on "wet steam." But all steam is really wet, and you see that we use the word wrongly. It is not steam, but water vapour that drives a steam-engine; and the water vapour turns into steam only when its work is done and when it can do no more.

WHY DOES AN EGG GET HARD WHEN BOILED, WHILE MOST THINGS SOFTEN?

There are certain kinds of chemical compounds with a special name which really means "like glue," and when these things are heated up to a certain point, they turn firm, or stiff. They have very big molecules, each made of a large number of atoms; but we do not yet understand why they should behave in this way. One of the best examples of them is white of egg, or albumen.

Albumen means white—England is called Albion because of the white cliffs at Dover. So when an egg is heated only to the temperature of boiling water—which is not really very high, for it is nothing compared with the temperature of a flame—all the albumen of the egg turns solid. The same thing would happen to the albumen of blood, which is very like white of egg—one of the reasons why eggs are such good food. There are other things which behave in a curious way when they are heated. For instance, nearly all salts are much more easily melted in water when it is hot than when it is cold; but there is a salt of lime—the salt made when lime is combined with the acid found in lemons—which melts readily in cold water, but unmelts and appears again when the water is made hot. We do not know why this happens.

WHAT MAKES THE AIR HEAVY?

Heaviness is what we notice in any kind of matter because the earth is pulling upon it. The more the amount of matter, or stuff, in the thing, the heavier it is, because the greater is the earth's pull for it, and its pull for the earth. The air is heavy because it is matter, and all matter is heavy because it is pulled upon by the earth. We find it difficult to understand why the air should be heavy, because we find it difficult to understand that the air is a thing. We sometimes talk about "airy nothings." But the air is a thing, as you would not doubt if you saw liquid air, or solid or frozen air.

Therefore, it would be just as reasonable to ask what it is that makes a table heavy as to ask what makes the air heavy.

And one way of answering either question would be that it is the earth that makes things heavy, for if the earth were not there to pull them, they would not be heavy at all—or, rather, they would have just a little heaviness in them due to the pull of the far-away sun. But the sun, though big, is so far away, and the earth is so near, that the heaviness of things, whether air, or a table, or anything else, is almost entirely due to the earth.

IF AIR WEIGHS 15 POUNDS TO A SQUARE INCH, WHY DOES IT NOT PRESS US FLAT?

There are two answers to this question. First, many things have strength enough in themselves to resist a pressure of fifteen pounds to the square inch without being pressed flat. A piece of steel, for instance, will stand a vastly greater pressure than that. Yet it is true that a great many things, such as our own bodies, for instance, could not possibly stand a pressure of fifteen pounds to the square inch were it not for one thing.

This is that the pressure is on all sides of us. Were it not so, our bodies would certainly be pressed, if not flat, at least very much out of shape. But the air is a gas—or mixture of gases, which comes to the same thing in this case—and one of the facts about a gas is that its pressure is the same in all directions. So, whilst our head is pressed down, yet all the sides of the body are pressed in and together, so that we are not flattened out. Thus, so long as the pressure is the same on all sides, it is, in a sense, as if it were not there.

WHAT WOULD HAPPEN IF THE PRESSURE OF THE AIR WERE REMOVED?

Suppose that we find some way of taking a part of the body—say, the arm—and removing the pressure of the air from it altogether, or, at any rate, reducing it very much. Now we shall have unequal pressure on the body, and something is bound to happen. So it certainly does.

Suppose that you had a pain in your arm or in the small of your back. Sometimes the best way of relieving this pain is to take a tumbler, drop a piece of something burning in it, and clap the tumbler on to the skin. You must take care not to burn the body, but that is quite easily avoided if you clap the tumbler on upwards instead of downwards. Then the air inside the tumbler is largely used up by the piece of burning rag or whatever it is, and the pressure inside the tumbler is very much reduced.

So it is almost as if the little circle of skin covered by the tumbler had the atmospheric pressure taken away from it, while all the rest of the body went on as before. Now we see what the atmospheric pressure can do. It is pressing on all the body except just that little circle of skin, and so it simply squeezes a lot of the body fluids into that part of skin, and it swells and swells and rises into the tumbler, until it looks very funny indeed. The air is pressing on every part of the skin except one, and that is the consequence. It does not hurt at all, though it looks as if it should, and it often relieves a deep-seated pain. Then, if you slip something under the edge of the tumbler so as to let the air in, it drops off; and now the air pressure is equal on all parts of the skin, and the swelling is smoothed out again. This way of relieving pain is called dry cupping.

IF CLOUDS ARE SOFT, WHY DO THEY MAKE A NOISE WHEN IT THUNDERS?

It is not the clouds bumping against each other that makes thunder. Certainly clouds are much too soft to make a noise when they do that. They are, indeed, too soft to bump at all, but simply mingle with each other. The thunder is due to the disturbance of the air when electricity passes from one cloud to another, or from a cloud to the earth. As it passes it makes the air near it very hot, and so starts a wave in it which we hear and call thunder.

WHY CANNOT WE HEAR WHEN WE ARE ASLEEP?

We can hear when we are asleep—if a sound is loud enough. It is only when a man is unconscious through some poison that the loudest sound will not wake him. Only when we are asleep we do not hear slight sounds. The reason of this is that in sleep the part of the brain which hears is much less sensitive than usual; and so, though soft sounds reach our ears, and affect the nerves that run from the ears to the

brain, the brain takes no notice of these messages. As to how much we require to wake us, it all depends on the depth of our sleep. It has been proved that during the earlier part of the night we require much louder sounds to wake us than towards the morning. So it is the earlier part of our sleep that is best for us, and there is good sense in calling this part of our sleep "the beauty sleep." Very often we do hear when we are asleep, but instead of the whole brain being awakened, only part of it wakens, and so we have all sorts of dreams that were really started by some noise. It is possible to whisper into a sleeper's ear and give him dreams in this way, without waking him; but this is certainly not a good thing to do.

WHY IS IT THAT STREAMS FLOW AND RIVERS DO NOT?

The answer to this is that rivers do flow. Perhaps streams often flow more quickly than rivers, because they may be running more steeply towards the sea. But the reason why you ask this question is that, as a rule, streams are shallow, and the stones and so on in their bed disturb the surface of the water. But a river is deeper, and so the surface of it seems smooth, and, unless we look very carefully, we think that it is still. If you throw upon it something that will float you will find that it is not still.

We must not be misled by the surface of things. There is a very good proverb which really answers the question; it is: "Still waters run deep." It is because the river is deep that we think it still. Of course, the real meaning of this proverb is, that in studying people we can learn from streams and rivers. There are people who babble and sparkle just as streams do, because they are shallow; and there are others who do not show much on the surface, but that may be because they are deeper people, and have more in them. So, when you are inclined to judge of such people on little acquaintance, it is well to remember the proverb that "Still waters run deep."

WHY DO MOTOR-CARS HAVE NUMBERS ON THEM?

Motor-cars have numbers on them because of a common failing in human nature. If we were all honourable and kind, if it were impossible for any of us to do harm without at once wishing to repair it as far as we could, then motor-cars would have no numbers on them. But since motor-cars often do damage, they have to be numbered both in front and on the back, so that they may be known again. It is not that anyone blames the motor-car, which is just a piece of machinery, and neither good nor bad; but putting a number on the car comes really to the same thing as putting a number on the man who owns or drives it, so that if he does harm, and does not care, we may be able to find him out. The fact that motor-cars have numbers can do no harm to honest people who have motor-cars, for they would act just the same whether the numbers were there or not. They are put to the expense of paying for them because some other people are not honourable, and I am afraid that very often happens to honest people.

WHAT MAKES OUR HEARTS BEAT?

It would take a big book to do justice to this question. We know positively that the heart can and does beat in an independent way quite apart from the brain or the rest of the body. If a frog is killed, as, for instance, by cutting its head off instantly—which is so quickly that the frog has no time to feel any pain—then, though the frog is dead, its heart still beats, as we find if we open the body. The heart can be completely cut out of the body, and will lie beating in your hand for a long time. So will the heart of a bird or a rabbit. This proves, of course, that what starts the heart-beat is in the heart, even though we know the brain can make the heart beat faster or slower, or can even stop it.

When we examine the heart of any animal very carefully, we find that it has a large number of nerve cells in it. If we cut a heart to pieces, any part which is cut away from the nerve cells stops beating, but any part which has nerve cells in it will go on beating until, at last, the heart dies from lack of food. But it is very interesting that the heart will go on beating for so long. If we attach tubes to the heart in place of the blood-vessels, and send fluids through it containing common salt and certain other salts which help to nourish it, it will beat for hours or even days—a most wonderful thing. In this way, without causing any pain to any animal—for I am speaking only of a heart by itself, the animal it belonged to having been killed

at once—we can study the action of different things on the heart. And it has thus lately been proved that sugar is a valuable heart food, while alcohol is no food to the heart at all.

COULD A BALLOON PASS OUT OF THE RADIUS OF THE GRAVITY OF THE EARTH?

Certainly a balloon could not pass beyond the gravity of the earth, because the balloon floats in the air, and, as it goes up, the air becomes thinner and thinner, until at last it is too thin to support the balloon, and the balloon can go no higher. If anything is to pass beyond the gravity of the earth, and escape from the earth, it must have some motion in itself sufficient to carry it so far that the earth cannot pull it back again.

This must have happened to the stuff which makes the moon when it was thrown off from the earth. It used to be thought that some or all of the iron and other meteorites which are sometimes caught in the air—and which we call shooting stars—might really have been formed in the earth. This was thought because these things were found to be made of the same stuff as the earth, at a time when we did not know that all the universe is made of the same kinds of stuff. It was supposed that volcanoes might have shot up stones and so on with such force that they passed right through the air, and left the earth altogether, and then happened to be caught by it again at some later date.

We do not think that now. It is very probable, however, that certain very light gases, which—because they are light—seem to exist mainly in the upper layers of the air, may escape from the earth altogether, perhaps being thrown off from the air as drops are from a twisting umbrella. That seems to be the reason why the moon has no air, since the moon is very small, and has not strength of gravity enough to keep a gaseous envelope, such as our air is.

WHAT WOULD HAPPEN IF GRAVITATION CEASED ON THE EARTH?

If gravitation ceased on the earth, there would be an end of life as we know it. Anything thrown into the air or jumping into the air would illustrate the first law of motion, which is that any moving thing must go on moving at a constant speed in the same straight line for ever unless something stops it. When a ball is thrown in the air, it does not seem to obey this law of motion, for the good reason, that, as it rises the earth is pulling upon it, and however strong your throw is, the earth's pull, in the long run, will stop the ball, and finally bring it back again. If the earth's gravitation ceased, the ball would rise out of sight, but even then its motion would be slowly stopped by the resistance of the air. At last the ball would stop rising altogether, *but it would not come back again*, for there would be nothing to make it do so. Even if you threw a ball down on the ground, it would bounce up, and you would never see it again.

At present we do not know the cause of gravitation. It is one of the great secrets. But we may learn it some day, and when we do, we may learn how to control gravitation, or even abolish it at will. This would be utterly different from anything we do now. No balloon does this, but merely provides something which "tells against" gravitation.

WHAT MAKES THE EARTH GO ROUND THE SUN?

There are really two questions here. If we grant that the earth is moving at all, the reason why it moves round the sun, and not in a straight line, according to the first law of motion, is that though, so to speak, it always tries to move in a straight line, the force of the sun's gravitation always turns it in towards the sun. But the other question is: What makes the earth go at all?

The sun's gravitation is certainly not the answer to this, for if the earth became still the sun would pull it into itself at once. There is some other source of the earth's motion, which was imparted to it or present in it when it was formed, and which throughout all the ages has not been done away by friction—since, as it appears, there is no friction as the earth swims through the ether. If there were any, surely by this time the earth would have been slowed down much faster and would have rushed into the sun.

This original motion with which the earth began, and which it still has, must have the same origin as the earth's twisting motion on itself, the motion through space, and the twisting motion of the other planets, and the twisting motion of the sun. We know that a

twist and move in the same direction, just as our moon does, and the moons of the other planets that have moons. For the source of all this motion, we must go back to the source of all motion and all power—back to the Author of all things. This is only to say, in other words, what used to be said long ago when it was thought that the solar system was created as it now is, each planet being "launched in its orbit from the hand of God." Orbit comes from the Latin word *Orbita*, meaning a path.

IF WE COULD DARKEN THE SUN, HOW SOON WOULD LIGHT REACH EARTH AGAIN?

Another way of putting this question would be, how long does light take to travel from the sun to the earth? Of course, anyone who can do simple arithmetic can answer this if he knows at what rate light moves, and how far the sun is from the earth. The rate of the movement of light through the ether is well known, and it never changes. It is slightly more than 186,000 miles in every second. The sun's distance from the earth varies a little, because the earth does not move round the sun in a circle, but in an ellipse. But we may take the rough figure of 93,000,000 of miles as the distance. Now, if we divide this figure by the other, we get an answer of about 490, which is the number of seconds it takes light to travel from the sun to the earth. The answer, then, which anyone can easily remember, is *a little more than eight minutes*. If we compare this with four and a half years, which about represents the time that light takes to reach us from the nearest star, it will help us to imagine what a wonderful distance the sun and his family are from their nearest neighbour.

WHY CANNOT WE FEEL THE EARTH GOING ROUND?

The answer to this is that we are going round with the earth, and, as we are moved round with it at exactly the same rate and in exactly the same direction, we notice nothing. If you were in a train and did not look out, and the train moved at a constant speed in a straight line, and gave no jolts at all, you would not know it was moving; but, if it suddenly went more quickly or slowly, you would feel its motion. So, if the earth were suddenly to go round very quickly—say, so as to make a day of six hours instead of twenty-four—we might feel that it was going round because our bodies might be affected, as they are when a train suddenly gives a jolt as you get in, and you find yourself in someone's lap.

The real lesson that we can learn from this question is that the only kind of movement which we can feel is relative movement—that is to say, movement of one thing as compared with another. If the earth or a train moved more slowly or more quickly than our bodies, then we should feel the movement. If we could imagine our body moving alone in space with no stars for mile-posts, then we should not know it was moving, for there would be nothing to go by—nothing to compare it with. We can feel relative motion just because there is something to compare it with. That is how we know the sun and earth are moving—by comparing them with other heavenly bodies.

WHY DO TWO SIDES OF A ROAD MEET IN THE DISTANCE?

Of course, we know that the sides of the road do not really meet, but they seem to meet. If an artist is showing us a road going away from us in a picture, he must really draw the two sides of the road towards each other, so as to give the eye the same impression that a real road does. This is a part of the study which artists call perspective—how things look when they are *seen along*, which is what the word means. Our eyes judge by the angle between things. Let us suppose that we use only one eye, to make it simpler; then, if you look at two dots, you judge of the distance between them by the width of the angle between the two lines from them to your eye. Now suppose the same two dots, the same distance apart, were much further away from the eye, then the angle between the lines is much narrower, and, in consequence, they seem much nearer together. If we imagine that the dots are taken on the sides of the road, at different distances along, then we shall see why the sides seem to meet in the distance. They do not really get nearer, but the "angular distance" between them gets smaller.

The next Questions are on page 1641.

WHAT THIS STORY TELLS US

WE find in the body of all the higher animals a wonderful pump, hollow, with tubes leading to and from it, which we call the heart. It is of different kinds in different orders of animals, but in all main points the heart of all the animals that have red blood is one and the same. We know that it beats during life, for we can feel it beating in ourselves if we have been running very hard, or if we are frightened; and if we pick up a kitten or a bird we can feel its heart beating under our fingers. It is a most astonishing thing, that, though as much as this was known for many ages—thousands of years, indeed—it was not until less than 300 years ago that we discovered what the heart really does, and how the blood moves. William Harvey, the man who made this discovery, was so great that we must learn something about him, and we can find his story in this book by turning to the index. Here we learn what Harvey discovered about the working of the heart and all that we know of it.

THE HEART—THE LIVING PUMP

CONTINUED FROM 1446

THE microscope was not invented in the lifetime of William Harvey, who first found out what the heart does and how the blood moves. It was therefore impossible for him to see the tiny channels by which the blood passes between the large vessels that leave the heart and the large vessels that go back to the heart. He died in 1657, and four years later a great Italian, the fortunate man who first had a microscope to look through, saw in the lungs of the frog the tiny vessels which Harvey had to die without seeing, though they completed the proof of his discovery. To-day any of us may see, with very little trouble, the wonderful tubes that William Harvey would have given so much to see when he was making his great experiments.

This picture shows us the exact position of the heart and its exact size in relation to the rest of the body.

These little vessels are so small that they are almost like hairs, and so they are called capillaries, from the Latin word for a hair. The large vessels which leave the heart are called arteries, and those which carry the blood back to it are called veins.

If we open an artery after death it is found to contain no blood. Arteries were therefore supposed to carry air, and that is what the word means, as we should see if we spelt it a little differently—airteries. This air was supposed to be the spirit or breath of the body, the real source of life.

Then a great Roman, Galen, opened an artery in a living animal, and found it full of blood. That made a stage in our knowledge. But many hundreds of years had to pass before it progressed any further. Then a great man, Servetus, who lived in the sixteenth century, and was burnt by Calvin for not accepting his views about religion, found how the blood passes through the lungs. But it was left to Harvey to find out how it circulates through the rest of the body. This circulation of the blood is a central fact of the body's working, no matter whether we consider our own bodies or those of animals; and we must understand it. Let us begin by looking at the heart itself, to understand its working.

This, as we have said, is really a hollow pump. Its walls are made of muscle, and it is certainly the most important muscle in the body. Day and night it ceaselessly

beats so long as we are alive. If it stops or falters for only a short time, we faint and fall to the ground. Its work is harder in human beings than in that of any other creature, for the part of the body which always most urgently needs blood is the brain, and in us, since we stand erect, the brain is above the heart instead of in front of it, so that the blood has to be pumped upwards by the heart. Also the heart has to beat so strongly as to send the blood down our legs with such force that it will come up them again through the veins. We know how apt our feet are to get cold, and the principal reason for this is that it is such hard work for the blood to return from them, and the circulation through them is therefore apt to get too slow. It is the warm blood that keeps the feet warm, since they produce very little heat for themselves.

This x shows the position of the pulse at the wrist. It is where the artery is just under the skin that we see it throb.

The heart lies in the upper half of the body, which we call the chest, and the chest is bounded by the long, thin bones which we call ribs. Some people have a curious way of thinking that the chest is only the front of the body, but of course it is not. The chest, or box, is in the whole of the upper half of the trunk, and it has a back as well as a front. The things that fill it are very simple to remember—a lung on each side, and the heart between them. We usually think of the heart as on the left side of the body, but, as a matter of fact, about one-third of it lies on the right side, and two-thirds on the left. If you put your hand on the front of your chest—it is best to use your right hand—then, with the tips of your fingers you can usually feel your heart beating, especially if you have been running hard, or are frightened or angry. You feel something coming up and bumping against your fingers about 80 times a minute. From 70 to 80 is the rate in grown-up people; it is rather slower in men than in women. But if you happen to be a small child your heart beats much more quickly, and in a new-born baby it beats about twice in every second. When we are hot and feverish it beats more quickly.

Veins like this carry the blood back to the heart. The little things like two halves of a ball are little valves like pockets, which stop the blood flowing back.

Now, if you put the fingers of one hand on your wrist, you will feel something beating there, too. This is usually called the pulse. The picture shows you where to find it. If you lay the hand back downwards you can feel the pulse on the inner side of the wrist. This is a good place for feeling the pulse, because a large artery running down to the hand, as it passes over the wrist, lies just between a piece of bone and the skin, so that it can be felt easily. If while you had one hand on your heart you put the thumb of the other on the wrist of the first hand, you would find that the number of beats in both cases was the same, but you would also notice that the beat at the wrist always came a very short time after the beat of the heart itself. It is the beating of the heart that makes the pulse, for it means that the heart is sending a wave of blood through the arteries, and since the blood takes a little time to travel, of course the beat at the wrist must be a little later than the beat at the heart itself. If you put your two hands on the two wrists of a friend you will find that his two pulses come at the same moment.

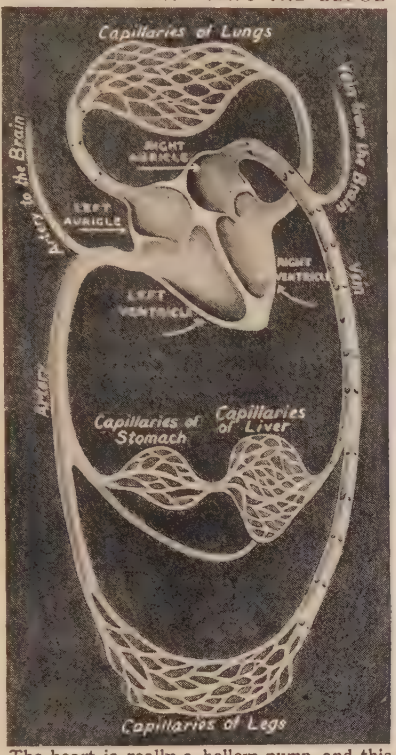
Now, we usually call the pulse at the wrist *the* pulse. But every time the heart beats it sends the blood through all the arteries, and there are several other places where we can notice a pulse. If you put your hand on your neck, as if you were going to choke yourself—only quite gently—you can feel a pulse on each side, due to the blood passing up through the great arteries of the neck on its way to the brain. If you put the tip of your finger on the side of your cheek, just in front of your ear, where you will find a little ridge of bone, which is really your cheek-bone, you will feel a pulse there, too. This artery is a branch of the great artery in the

neck, and is carrying a small supply of the blood to the scalp. But the greater part of the blood in the arteries of the neck is going inside the skull to the brain.

Lastly, you may find for yourself one other pulse which we have all noticed, though perhaps we did not know what it meant. If you cross your legs and watch the crossed foot, you will see that it gives a little jerk up and down. If at the same time you feel the pulse at your wrist, you will find that the two rates are the same, but your foot always jerks a little later than the wrist pulse. Now, that little kick is due to the fact that the great artery of the leg runs down the middle of the back of the knee in a beautifully protected fashion; but when you cross your legs you press that great artery against the hard bone of the other knee, and every time the artery swells with the pulse of blood in it, the result is that the whole leg gives a little kick. If you look at the front of your body just below your chest, when you have had a hot bath, you may very likely see the biggest pulse in the whole body; a sort of heave which is due to the great artery that runs down from the heart along the front of the spine, and among the branches of which is the artery which makes your foot kick when the legs are crossed. All these things, of course, have been noticed for many ages, but men always thought, though it is difficult to understand now how they could have thought it, that the blood went backwards and forwards to and fro on each side of the heart, instead of seeing that it went round and round.

We have spoken about some of the great arteries in the body and the pulse in them. Now let us consider the veins. These are tubes very like the arteries, but very much thinner. They can afford to be thinner, for the pressure of blood inside them is not nearly so high as it is in the arteries. Many of the veins lie on the surface of the body just under the skin so that we can see them. As we have said, the blood in them is running back to the heart. There is no pulse in the veins, because, before the blood has reached them, it has had to pass through the tiny tubes, which are the communication between arteries and veins, and there the pulse gets less noticeable, so that the blood flows upwards quite evenly through the veins.

HOW THE HEART PUMPS THE BLOOD



The heart is really a hollow pump, and this picture shows how it sends our blood rushing through our body. Pure blood from the lungs flows into the left auricle, which pumps it into the left ventricle, from where it flows up into the right auricle, then into the right ventricle, which sends it into the lungs.

The time may come to any one of us when there is an accident to ourselves or to someone else. An artery or a vein is cut, and the person bleeds. Now, the blood is very precious, and no one can afford to lose it. Therefore, our duty is to stop bleeding whenever we see it. It may happen to anyone who has a little bravery and a little knowledge to save a life in this way. Here are the rules.

The first does not depend upon any knowledge of the circulation, and is as simple as can be. Let us suppose that a stone has been thrown, and someone's face has been cut and is bleeding. There is a handkerchief at hand, of course, and when that is dabbed on and taken away you can usually see some point where the blood is oozing or spurting. Now, the rule, and the whole rule, is to put your finger on that point and to keep it there. This can be done in an instant, and directly it is done, no more blood can be lost until you take your finger away, and that is exactly what you are not to do. It is

something like the famous story of the Dutch boy who stopped the leak in the dyke where the water was coming through by thrusting his little arm into it, as told in the poem appearing on another page. Once your finger is put on, there is no immediate danger, and everyone has time to think. A doctor can be brought, or the wounded person can go to a doctor; but the first rule, which is worth all the others put together, is simply to put your finger on the bleeding point, and keep it there.

WHAT TO DO TO STOP BLEEDING WHEN AN ACCIDENT HAPPENS

Now, the other rules depend upon our knowledge of the circulation of the blood. Let us take a very common instance. There are quite large veins on the surface of the leg, and sometimes these get very stretched and swollen and weak. One of them may even give way altogether, and the blood may begin to ooze through the skin. Where there is no help at hand, a person may bleed to death in consequence of this little accident. Of course, anyone who knew the rule about putting the finger on the bleeding point, and who kept his head, would always save himself, but then most people do not learn these little rules. They are busy learning such a lot of grammar that they have not much time to learn how to save lives.

But when that rule has been followed, what else can be done? What we do will depend upon our knowledge of the circulation. The blood in this broken vein in the leg is flowing upwards towards the heart. Therefore, we must apply our pressure, let us say with a handkerchief, *below* the bleeding point.

THE TWO PUMPS OF THE HEART AND THE WORK THEY DO IN OUR BODIES

Veins have valves in them, which are so arranged as to prevent the blood from flowing back through them; but in a case such as we have described, it is sometimes necessary to apply the pressure both above and below the bleeding point, for sometimes these valves give way. Also, the valves in our veins are not arranged in the best way for a creature that walks erect; they are arranged in the way that would be best for a creature walking on all its four limbs. That is very interesting. But now let us suppose that there has been an accident, and someone is bleeding in a different way. Let us suppose that the blood is brighter, and that instead of oozing it comes in jets or spurts. This means that an artery is bleeding, and though in any case we put our finger on the bleeding point, the next thing to be done is different, for the blood is coming from the centre, and not going back towards it, so we must apply our bandage above the bleeding point, on the side nearest the heart.

Now let us look at the heart and see exactly how it does its work. What we call the circulation of the blood is really two circulations, and the two circles meet in the heart. There is, of course, only one continuous stream, but as the blood passes along this stream, it really goes through two circles, one large and one small. There is the circulation through the lungs, the use of which we know, and there is the circulation through the body, the use of which we also know. The heart, then, is really two pumps. It has a left side and a right; the left side gets the pure blood from the lungs and sends it to the body; the right side gets the impure blood from the body and sends it to the lungs.

THE WONDERFUL WAY IN WHICH OUR HEARTS ARE MADE

The two sides are made on just the same principle, and each consists of two chambers. The upper one, which is the smaller, is called an *auricle*. It receives the blood, and then drives it into the lower chamber, which is much larger and stronger. The auricle has only thin walls, for its work is not hard—it only has to send the blood a very short distance through valves. But the *ventricles*, as the larger chambers on each side are called, are different. The right ventricle has to send the impure blood, which the right auricle has received from the body, to the lungs, and as this needs a good deal of force, the right ventricle has a fairly thick muscular coat. But the left ventricle has to send its blood throughout the entire body—brain and toes and all, and so its walls are exceedingly thick and its power is tremendous. It is much the bulkiest part of the heart, and the tip of the heart, which you feel when you put your finger on your chest, is really the tip of the left ventricle.

The picture on page 1581 will help us to understand the course of the blood.

Let us imagine that we could watch it, and let us take a drop of pure blood that has just entered the left auricle. The auricle squeezes it, like a fist squeezing something in it, and drives it into the left ventricle. When the ventricle is stretched and full, it replies by squeezing and beating in the same way, and drives the blood through the largest artery in the body, called the aorta, so that it goes to nourish every part.

THE WAY IN WHICH A DROP OF BLOOD FLOWS THROUGH YOUR VEINS

Perhaps the drop of blood we are watching stays in the aorta until the openings of many of the first branches of it are passed, and runs down the branch which goes to the left leg, and nourishes the life of the cells at the base of a toe-nail, and then starts on its long journey back again through the veins. But now, of course, it is dark and impure. It does not go straight to the lungs, however, for the force with which it was sent from the heart is now nearly exhausted. Instead of going to the lungs, it goes back to the heart itself, and so completes the larger circle of the circulation. It passes up in a great vein, which opens into the right auricle. When the auricle is full it contracts and beats, and sends the blood into the right ventricle. This contracts in its turn, and sends the blood to the lungs. It comes back from the lungs, pure and bright, by vessels which open into the left auricle—and that is where we began. We see, then, how the circulation consists of two circles joined at the heart.

We must not suppose that all the purifying of the blood is done in the lungs. Many waste matters are filtered out of it as it passes through the skin and the kidneys; also, as it passes through the body, it gets fresh food material, so that, in some respects, the blood which comes back to the right auricle from the body is better than the blood which left the left ventricle. Only it is much worse in respect of its gases, and that is why it has to be sent to the lungs.

THE LITTLE NERVE CELLS THAT START THE HEART'S BEAT

But we must ask ourselves how and why the heart is made to beat. We must think of it as a great muscle, very complicated and very different from any other muscle in the body, but still really a muscle. Now, muscles are not masters, but servants; they are made of living cells, we know, which contract; but they never do so of themselves. Every kind of muscular tissue in the body is the servant of nerves, and does what it is told. It contracts only when a nerve orders it to do so.

We find, then, in the heart itself a large number of nerve cells, and it is these that really start the heart's beat. They are very sensitive, and very quickly affected by almost every possible influence. For instance, heat affects them very much, and the heart beats more quickly when we are hot; then all sorts of strange things in the blood affect them, such as alcohol, and the gases which enter the blood when a man smokes, and many other poisons. Some make the heart beat more quickly, some more slowly, and smoking may often make it beat irregularly.

But we must not think we have nearly finished describing the nervous government of the heart and its beating. It is far more wonderful than that. After all, the whole of the body really exists for the sake of the brain, and if the brain could not control the heart, things would soon go wrong. For instance, when we are standing or sitting upright, the work required in order to send enough blood to the brain is harder than when we are lying flat. It is therefore necessary that the heart should beat more quickly when we stand or sit than when we lie, and so it does. But this can only be done through the brain giving orders.

THE TWO SETS OF NERVES THAT RUN FROM THE BRAIN TO THE HEART

So we find that two sets of nerves run from the brain to the heart. For convenience we may just call them two nerves. These control the nerve cells that belong to the heart itself. When an order is sent down through one of these nerves, the heart beats more strongly and quickly. When an order is sent down through the other, it beats less strongly and less quickly. From moment to moment throughout the whole of our lives, the brain is thus able to control the beating of the heart. We know exactly the cells that do this work.

There is another most important fact about the circulation which teaches us again how marvellously the brain controls the body. If we examine the wall of an artery, we find it very beautifully

and wonderfully made. It has a firm outer coat, and a perfectly smooth inner coat; and between these two there are a great number of elastic fibres, so that the artery can be stretched when the heart sends a pulse of blood through it, and then spring back to its former size. But there is also a great quantity of muscular tissue in the wall of every artery. Every fibre of this muscular tissue in the arteries of the whole body is governed by nerves, and acts on the orders which they send, and all these nerves spring from, and carry messages from, a small group of cells in the brain lying quite close to the cells that govern the heart.

THE NERVE MESSENGERS THAT CARRY THE BRAIN'S ORDERS THROUGH THE BODY

Now, the extent to which the muscular tissue of an artery is contracted decides its size, and this decides the amount of blood that will go to the part of the body which the artery supplies. Hence, there is not a single part of the body that has not its supply of blood regulated by the brain. When we examine it further, we find that, just as in the case of the heart, there are two sets of nerves—one to carry messages ordering the blood-vessels to contract, the other to carry messages ordering them to relax.

In almost every part of the body these changes are going on as they are needed. Usually a message is sent by the part of the body in question up to the brain—perhaps a message for more blood, and perhaps a message for less blood. When we go out on a very cold day, the nose needs a large quantity of blood in order to warm the cold air that passes through it on its way to the lungs. It sends a message to the brain, and the blood-vessels in the lining of the nose are all ordered to relax, so that large quantities of warm blood rush quickly through the nose, and warm the air we breathe. Sometimes the message may be of a different kind, and perhaps it may be impossible to see its use. For instance, in the act of blushing, a message is sent from the brain to the arteries which supply the face and neck, so that they become relaxed, and a flood of blood surges through the skin.

YOUR BODY IS A LIVING MACHINE, UNDER THE COMMAND OF LIFE

What we must remember, then, is that though the body is a machine, yet it is a living machine, alive and under the command of life. We can hardly think of anything more wonderful than the circulation of the blood, with its power of adapting itself from moment to moment to the needs of the body. The instances we have noticed are quite good ones, but there is another which is the most beautiful of all.

When we think, the brain requires more blood. Suppose, then, that we take a man and lay him flat on a delicately balanced table, and place him so that the table lies quite flat and not tilted up at either end. Then, when we have got this right, let us give him a difficult sum to do in his head. No sooner has he begun to work it out than the end of the table where his head is begins to fall. The reason is that the blood has become heavier and weighs down that end of the table.

THE LITTLE TUBE WALLS THAT LET THE GASES PASS IN AND OUT OF THE BLOOD

Now, there is one other thing that we must clearly understand about the circulation. We have got the idea of the blood streaming round in a system of closed tubes; but, of course, if the walls of the tubes let nothing through them, the circulation would be of no use, and we have already learned that they let gases through them. The arteries themselves are too thick for this, and so are the veins. It is the tiny tubes, or capillaries, which consist of only a single layer of very thin cells, that allow the gases to pass in and out of the blood.

That is what happens in the lungs. But throughout all the rest of the body, while carbonic acid is passing inwards through the capillaries from the tissues, all sorts of food supplies are soaking out through the walls of the capillaries into the tissues for them to live on, while all sorts of poisonous things which the tissues have been making soak back into the capillaries, and are carried through the veins to the heart. But the opposite happens when the blood visits the kidneys, for thousands of capillaries in the kidneys are specially arranged close to little tubes lined with special cells that have the power of picking out all these waste products from the blood, and so getting rid of them. Thus, the blood in the veins from the kidneys is purer than the blood in the arteries going to the kidneys.

The next part of this is on page 1633.

WHAT THIS STORY TELLS US

THIS is the story of some of the men who, 800 years ago, "took the Cross," as the saying was, to fight against the Saracens in the Holy Land. They were called Crusaders, partly because they wore the Cross on their garments as a sign of their faith and of the vow which they had taken, and partly because they were going to fight for the Cross against the Crescent, which was the badge of the Mohammedans. They left their homes, having taken a vow to strike a blow to win back from the Turks the Holy Sepulchre, where the body of the Saviour had lain. And many men deemed it the part of all true knights to take the Cross, and counted a death with sword in hand against the infidel the best that a man could die. Now, when we see in some old church a tomb bearing the effigy of a knight in armour, lying with his legs crossed, we may know that he was one who went on Crusade, because the crossing of the feet was taken as the sign of a Crusader.

THE MEN OF THE CRUSADES

CONTINUED FROM 1474

IN the ancient days men were wont to go on pilgrimages; that is to say, they would take long journeys in order to visit the holy places of the world. By the holy places we mean the spots where holy men had lived or had met with a martyr's death, or where they had been buried. For this custom there were many reasons.

First, when we go to such places it helps us to think of those saints and martyrs, and to strive to live lives like theirs. But besides that, in those days everyone believed that it was right to pray to the saints and martyrs to intercede for them before the throne of God; and they fancied that the saints would listen more readily to prayers that were offered in the places that had been dedicated to their memory—that is, set apart as belonging to them for ever. Besides that, men were taught that to go on such pilgrimages was a virtuous act, by which they could atone for sins of which they had repented; and the more difficult the journey was, and the more dangers and sufferings and discomforts the pilgrims had to endure on the way, the more complete they imagined the atonement would be; also, the more sacred the spot was to which pilgrimage was made, the greater they imagined would be the merit of visiting it.

Now, of all the sacred places, the most holy were in Palestine: the places where the Saviour had stood, the spot where He had been crucified, the spot where He had been laid in the tomb from which He had risen. Therefore, of all pilgrimages, the pilgrimage to the Holy Land was that most highly valued; because, also, Palestine was distant, and the journey was long and hard. For hundreds of years the Holy Land was a part of the Roman, or Byzantine, Empire, so that its rulers were Christians.

But at last there arose among the Arabs a certain Mahomet or Mohammed, who preached a new religion, calling himself the Prophet of Allah, the Most High God, whose doctrine was called Islam, and his followers Mohammedans, or Moslems. And the Moslems conquered Egypt and Palestine, and a great deal of the western part of Asia which had belonged to the Christian Byzantine Empire, so that Palestine became a part of what was called the Saracen Empire.

Now, at the first, the Saracens did not ill-treat the Christians, and the pilgrims were allowed to visit the Holy Land as before, though they had to make payment to the Saracen rulers. But presently the Turks, who had come into Western Asia from the East, and had turned

Mohammedans, became the most powerful of all the races who dwelt in the Saracen Empire; and when they got the government of Palestine into their own hands, they began to treat the Christians with great cruelty, so that it seemed likely enough that the pilgrims who went to the holy places would, in very deed, lose their lives and even become martyrs themselves.

THE MEN WHO CALLED UPON THE PEOPLE TO MAKE A HOLY WAR

Even before this, there had been some to whom it seemed a shameful thing that the land where Jesus had lived should be in the hands of unbelievers, although so long as they did not treat their Christian subjects harshly, and left the pilgrims in peace, the nations of the West were not minded to go to war with them just to help the Emperor at Byzantium to win back lands which he had lost. But now there came a change; and first the great Pope, Gregory VII., tried to persuade the peoples of Christendom to unite in trying to restore a Christian dominion in the Holy Land.

Pope Gregory failed. But after him there came a Pope named Urban II., who was exceedingly zealous in the matter; and to his aid came a man who was a most eloquent and fervid preacher, who was called Peter the Hermit. This Peter had been himself to the Holy Land, and with his own eyes had seen the cruelties that the Turks inflicted on the pilgrims; and he came back with his heart hot within him, and told the Pope what things he had seen. And Urban bade him go forth and preach of these things. So he went to the great cities, riding upon an ass, and carrying before him a great crucifix; and his preaching stirred the hearts of all who heard him; and great crowds gathered to listen to his words, which burned like fire. When he told them that now they might do a great work for Christ by going to rescue His sepulchre from the heathen, winning thereby pardon for all their sins and everlasting salvation, a passion of enthusiasm took hold of them. Then Urban summoned a great council of bishops and princes and nobles to meet and make an end of their quarrels among themselves, and to take counsel how the holy places might be won back from the Turks; so that a great multitude gathered at Clermont, which was the place of meeting. And after the great people had taken counsel and agreed together, Pope Urban went out and preached to the vast crowd, urging them to take the Cross and to join the Holy War; and, when he had finished, all the people cried out as with one voice: "It is the will of God! It is

Pope Urban the Second is here rousing the people for the First Crusade. He summoned a council of bishops, princes, and nobles at Clermont, and preached to them and their followers, urging them to join a Holy War. When he had finished they cried: "It is the will of God! It is the will of God!"

Richard the Lion-Hearted was the strongest knight and the most fearless fighter of his time. He led a large army to the Holy Land and captured Acre from the Turks. Here we see him at the prow of his ship, entering Joppa. He fought and won many victories over Saladin, the great Saracen chief.

the will of God!" Now, many nobles and many knights pledged themselves to join the army of Christendom which was to be gathered for the recovery of the Holy Sepulchre, under the leadership of Raymond, the great Count of Toulouse. But long before the army could be ready, and much preparation was necessary, there was a host of eager people clamouring that Peter the Hermit should lead them against the Paynim without delay; and, since they needs must have a soldier at their head as well as a hermit, they chose a knight who was called Walter the Penniless.

The Crusaders set forth, being, indeed, no more than a vast rabble of ignorant folk, without order or discipline, who deemed that since they were journeying to the Holy Land, they might do what they would by the way. And they did so much ill that wherever they went the peoples rose up against them in self-defence; and, of all that rabble, not one out of every ten ever reached even Asia at all. But, being there, the Saracens found it no hard task to destroy them utterly, save a very few, including Peter, who escaped back to Byzantium, which was another name for Constantinople. However, the army which the princes and nobles were gathering fared in different sort. In that company were many famous warriors; Raymond of Toulouse, a baron whose power was greater than that of many kings; Tancred, the flower of knighthood, of whom in years to come the famous Italian poet Tasso sang; Godfrey of Bouillon, noblest of them all, with his brothers Baldwin and Eustace of Boulogne; Bohemund of Tarentum, a Norman knight, whose father, Robert Guiscard, had carved himself a kingdom in southern Italy; Robert Duke of Normandy, William the Conqueror's eldest son, whose brother, William Rufus, was king of England. So that he might have gold to equip his troops for the great enterprise, Robert gave his dukedom to the "Red King" in pledge, receiving from him a sum of money.

Duke Robert, who was held captive by his brother for twenty years

A very valiant knight was Duke Robert, but not over wise; easily outwitted by fierce William and his craftier younger brother who became the King Henry I., by whom, in after years, he was taken prisoner in battle, and held a captive in Cardiff Castle for twenty years until he died. Men said, though it may not be true, that the king had the luckless duke's eyes put out.

The way to Asia lay through the lands of the Byzantine Empire, where the emperor ruled at Constantinople; and little liking had he for the great host which was marching, not to win back his lost lands for him, but to drive out the Turks and set up a new Christian kingdom. But glad he was when the last of them had crossed the straits called the Bosphorus, and stood on the soil of Asia. And then they had a long way to march before them, and many fierce battles with the Turks before they could reach Jerusalem.

THE CRUSADERS FALL ON THEIR KNEES BEFORE JERUSALEM

Of these fights the fiercest was the long struggle at the city of Antioch, which the Crusaders held it needful to seize. Yet the Crusaders were unskilled in the art of sieges, and the Turks held the city stoutly. The siege lasted long; and, throughout, the boldest deeds were those of Godfrey of Bouillon and the Norman Robert. At last, however, a traitor within the gates made a plan to let in Bohemund of Tarentum with his knights; and so the town was taken. But still the citadel held out, and new armies came to help the Turks; so that the besiegers of the citadel were themselves besieged within the city. At last, however, the Christians sallied forth, and there was a great battle, which the Christians won; and after that the citadel itself surrendered. There Bohemund remained as lord. But the army of the Crusaders went on to Jerusalem itself.

Now, when they came in sight of the Holy City, the Crusaders fell on their knees, offering thanks that at length they had been permitted to behold what they had longed for; and so made ready for the assault, since the city was very strong.

HOW THE CRUSADERS SWEPT THE TURKS BEFORE THEM AND WON JERUSALEM

But on the first day, in spite of the fury of their attack, they were beaten back; whereby they learned that valour alone, lacking skill, would never gain them an entry. Therefore, they built engines of war for the storming of strong places, battering rams, and catapults for hurling great stones, as gunpowder had not at that time been invented. At last, after many days, during which they had suffered much from thirst, the assault was renewed. All one day they fought, and still the Saracens beat them back; but again they attacked in the morning. Now while the battle raged, Godfrey saw on Mount Olivet a knight who waved a glittering shield; and he cried out "Behold! St. George is come to aid us!" At that inspiring word, the Christians were filled with a new strength, and rushed upon the Saracens; and this time they carried the rampart. The first on the top was Letold of Tournay, and the third was Godfrey. Then they swept the Turks before them; and Jerusalem was won.

Very fierce and cruel was the slaughter, and very few were they who sought to save the lives of the conquered, except Tancred; for men felt that they were right to slay and spare not, as in ancient days the Israelites had slain the Canaanites. But after the slaughter all went to pray, and to humble themselves at the Holy Sepulchre; and after that they did honour to the hermit, Peter, who had first roused them to the great enterprise, of whom thereafter we hear no more.

GODFREY OF BOUILLON, WHO MIGHT HAVE BEEN KING OF JERUSALEM

And then, when the chiefs had taken counsel together, they offered the crown of the kingdom of Jerusalem to Godfrey of Bouillon, the worthiest, though they would have been willing to give it to Duke Robert had he been willing to take it; and many to whom others had no will to give it were willing to take it. But Godfrey himself would in no wise wear an earthly crown in that city, where the King of Heaven had worn the crown of thorns, and so he called himself only the Baron and Defender of the Holy Sepulchre. Then Godfrey abode at Jerusalem, scattering the Saracens who came against him; and a year later he died, having just made good laws for the new kingdom. A wise man, valiant and just, honourable, who feared God but none other, was Godfrey of Bouillon.

To other knights were given other lordships, as Antioch to Bohemund, in whose absence Tancred ruled wisely and well, and Edessa to Baldwin, the brother of Godfrey; and this Baldwin was made king of Jerusalem when Godfrey died. Baldwin reigned for eighteen years; and after him came

another Baldwin, not his son, but a kinsman. These two Baldwins brought more lands and cities under their dominion, which was known as the "Latin Kingdom"; and one of these cities was the famous Tyre. In those days were founded the two great Orders of the Knights Templars and the Knights Hospitallers, or Knights of St. John, who were vowed to fight as soldiers of the Cross, yet to remain poor and unwedded, like monks, among whom were many very valiant soldiers. After Baldwin II. came Fulk of Anjou, and after him his son Baldwin III., in whose time the Turks won back Edessa.

Now, many pilgrims had come to Jerusalem, and many knights had come to Palestine to fight on behalf of the Christian kingdom against the Paynim, as the infidels were called; and these, too, were called Crusaders, or champions of the Cross. But because of the fall of Edessa, another great army was formed to march against the Saracens; and this is called the Second Crusade.

ST. BERNARD, AND HOW HE STARTED THE SECOND CRUSADE

This time the man who roused the princes of Christendom to the war was Bernard of Clairvaux, who is called St. Bernard, a man learned and eloquent, and of a fiery zeal. But though Conrad, the German emperor, and Louis VII., the French king, took part in this Crusade, and a vast host with them, yet it came to no good end, by reason of divided counsels, and, what was worse, of treachery.

Being jealous of each other, some of the great lords wilfully gave evil advice, so that when the crusading army came to battle with the Saracens they were defeated. But, as for Bernard, he held that the army had been defeated because the Crusaders had not marched with a single eye to the honour of God, and therefore God had not given them the victory. In this Bernard judged wisely. It may be that, if he himself had gone with the Crusaders to encourage them, a nobler spirit would have possessed them.

Nevertheless, though this Crusade came to nought and Edessa was lost, the young King Baldwin of Jerusalem held his own against the Turks, and even won the city of Askelon. But now evil days were in store; for there rose up in Egypt, which was ruled by the Saracens, a young man whom the Christians called Saladin, who, being just appointed vizier, or chief minister, by the Sultan of Egypt, presently made himself master not only of Egypt, but also of Syria. And all men agree in speaking the praises of this Saladin as a wise and just ruler, and a very valiant and courteous knight, for all he was no Christian, but a Moslem.

THE MERCY OF SALADIN, THE EMPEROR WHO WENT UP AGAINST JERUSALEM

And, indeed, not Saladin only, but other great leaders of the Saracens had shown that they could match the best of the Christians in true chivalry and gentlehood. But while Saladin waxed strong, Baldwin died, and two more Baldwins after him. And one, Guy of Lusignan, became king of Jerusalem. But now Saladin was minded to win back Palestine; and he went up against the King of Jerusalem with a great army and overthrew him at Tiberias, and took him prisoner. Then, one after another, the cities of Palestine surrendered to him, save Tyre, where Conrad of Montferrat defied him, and Jerusalem itself. But to Jerusalem he offered very generous terms if the people would surrender; and though at first they would not, yet, after a short while, when he promised to show the people mercy, and do nothing more, Jerusalem, too, surrendered.

And even so the mercy of Saladin was far more generous than the mercilessness of the Crusaders when they won the Holy City, Jerusalem.

THE THIRD CRUSADE, IN WHICH PRINCES AND KINGS MARCHED TO THE HOLY LAND

But when the peoples of Western Christendom heard that Jerusalem was once more in the hands of the Turks, a third great Crusade was resolved on, wherein princes and kings took part, and chief of them Philip Augustus, the young king of France, and Richard, the heir to the throne of England, who became King Richard I. while preparation was yet being made; and because Richard was the strongest knight and the most fearless fighter living, men called him Richard Cœur-de-Lion, or Lion-Heart. Yet even more renowned and mighty than the kings of England

and France was the German Emperor Frederick, who was called Barbarossa because of his red beard.

While the other kings and nobles were settling their own quarrels, or making preparation for this third Crusade, Barbarossa marched by land at the head of a mighty army past Constantinople into Asia, and it seemed likely enough that Saladin would meet more than his match. But Barbarossa died suddenly, whether he was drowned, as some say, in crossing a river, or from a sharp sickness caught from bathing therein; and the most part of his army perished miserably, though a part reached Antioch and conquered it again.

But now, while Richard Lion-Heart still tarried in Sicily, Philip of France and most of the army came by sea to Palestine, and sat down to besiege the fortress of Acre, where Richard presently found them, more intent on a quarrel whether Conrad of Montferrat or Guy of Lusignan should be king of Jerusalem than on war with the Saracens.

How Richard the Lion-Hearted hid his face before Jerusalem

Now, although the Christian kings and nobles ranged themselves on the side of Guy or of Conrad, Philip supporting the one, and Richard the other, and though each of them sought to thwart his neighbour, and the whole camp was full of feuds and jealousies, yet chiefly through the prowess of Richard, Acre was captured. Nevertheless, there were bitter quarrels between King Richard and the wily French king, and also the Austrian Duke Leopold, whom Richard treated with open scorn, for which he paid dearly enough later. But after the fall of Acre, Philip and Leopold and many others deemed that they had fulfilled their vow as Crusaders, and betook themselves home again; but Richard remained, being full of zeal to win back Jerusalem.

Yet this was not to be; for now the Crusading army was but small, and the hosts of Saladin outnumbered them many times. And so, though the King of England marched against Jerusalem, he knew, before he reached it, that the attempt must be in vain. Therefore, when he came within sight of it, he hid his face, as one unworthy to behold the Holy City, which he could not rescue, and turned back again. Yet, whenever he came to battle with the Saracens, he wrought such mighty deeds of valour that he won from Saladin terms for a truce, hoping that he might yet return and do battle for the Holy Sepulchre.

How Richard was slain by an arrow, & the Crusaders went forth again

Yet this, too, was denied him, for on his way to England, travelling alone, he fell into the hands of his enemy, Leopold of Austria, and was held prisoner for a long time before he was ransomed at a great price; and not long afterwards he was slain by an arrow in some small war.

But men tell of the high honour in which he and the Sultan Saladin held each other; and how, for many a long year, the Saracen mothers would frighten their children when they were naughty with the name of Richard Lion-Heart.

Now, less than a hundred years had passed since Godfrey of Bouillon and the warriors of the First Crusade had won back Jerusalem from the Turks and set up the Latin kingdom. Yet Saladin had in truth overthrown the Latin kingdom for good and all, though still the name of it was kept up. But still, for a hundred years more, Crusades were undertaken from time to time, though, because the princes of Western Christendom would never unite together loyally, the Moslem still held Jerusalem, and Christendom never won it back.

Of the men who went upon the fourth and fifth Crusades there is nothing good to tell; and as for the fifth, it was turned not against the Paynim at all, but against the Christian empire of Byzantium.

The shameful and pitiful tale of the Children's Crusade

There is another story about the Crusades which does not really belong to our Book of Men and Women, for it tells of a multitude of children who were allowed to set out on a Crusade of their own. We must suppose that their parents let them go, believing that God would work a miracle on their behalf. Yet the Bible does not tell us that if people do a very foolish thing, God will save them from the consequences of their folly by a miracle. At any rate, a vast number of children were suffered to gather together in France, and to march down to the sea

THE CAPTURE OF KING LOUIS OF FRANCE

Louis IX., one of the noblest French kings, led a large army to the Holy Land. Though they fought valiantly, they were overwhelmed, and Louis himself was captured by the Saracens. This picture, painted on the walls of the Pantheon in Paris, shows the king a prisoner, and he was only ransomed by the payment of thousands of dollars. After his return to France he started on another Crusade, but died before reaching the Holy Land.

to travel to the Holy Land. But of these thirty thousand children, ten thousand had already strayed away before ever they reached the sea; and whether any of them got home again, no one knows. When the rest reached the sea, the luckless children fancied that God would drive the waters back, so that they might journey on to Palestine dry-shod, as the children of Israel passed through the Red Sea. Yet while they waited in that vain hope, certain evil-minded folk saw their plight, and said, "We will take you on our ships, as many as we can, not for money, but for the love of the Holy Cross;" and so they took some five thousand of these children aboard. Now they sailed away joyfully; but when they had crossed the sea, those evil folk took them down to the slave-markets of the Turks, and sold them all.

Nine Crusades are counted in all, and though great men were numbered among them, who took the Cross, such as the German Emperor Frederick II., and in the last Crusade the English Prince Edward, who became Edward I., yet it seems as if there was only one of them who sought the Holy Land with a pure heart for the glory of God. That one was Louis IX., King of France, who is called Saint Louis; for he, having approved himself one of the best of all kings in his own land, and having won such repute for wisdom and virtue that men came to him even from other lands to judge between them and pronounce what was just, now left his kingdom in obedience to what he deemed the Divine call.

Nevertheless, for all his singleness of heart, he, too, was doomed to fail, for there were folly and jealousy among the leaders, and Louis himself lacked the skill of a great general. And it so befell that, at last, when the army was already well-nigh broken in pieces, a great host of Saracens came upon them, and overthrew them, though Louis himself and many another fought valiantly. Louis himself was taken prisoner, and was set free only for a very great ransom. After him there is no other Crusader to be noted unless it be Edward of England, of whom we read in another place. But of all the men who went on Crusade, although Richard Lion-Heart won the greatest renown for pure prowess in battle, yet the names which claim highest honour are those of Godfrey of Bouillon and Louis of France.

The Sultan Saladin was the great champion of the Saracens against Christianity. He was not only a valiant fighter, but a chivalrous and large-hearted man, and held King Richard Lion-Heart in such honour that, though he defeated him, he asked him to come and see him and made a truce with him. This picture shows their meeting.

The next stories of Men and Women begin on page 1655.

THE HISTORY OF OUR LAND

WE are giving in this volume a short description of our government instead of another chapter of the History of Our Land. You will find that our Constitution is a written agreement under which the people of the United States agreed to live. This Constitution divides the government into three parts, one of which makes the laws, another carries them out, and the third decides whether or not they have been broken. The powers and the duties of all are described and you will see that the officers of none of these parts can do as they please but must obey the rules laid down in the Constitution. We find that our President has greater power than many kings, and that no other court has such authority as the Supreme Court of the United States.

HOW WE ARE GOVERNED

CONTINUED FROM 1400

THE editor has decided to give you, in this volume, a little account of our government instead of going on with the History of Our Land. Later we are going to say a great deal about the Constitution and the trouble that arose between those who thought it meant one thing and those who thought it meant another. You cannot understand our history unless you know something about the government.

But why should you trouble your head about these matters of which the grown-ups talk? Because the boys and girls of today are the men and women of tomorrow. One of these days you will be expected to have a share in the government. All boys born in this country, and many who were not, will have to do their share after they become twenty-one years old.

What has the subject to do with girls? Do you know that in six states of the Union, into all of which our book will go, women have exactly the same rights of voting and holding office that men have; and in many other states they vote for some officers? Before you are grown up, it is quite possible that women will have the right to vote in many more states.

More than this, however, is the fact that boys and girls cannot be intelligent men and women or good citizens unless they know something about the laws of the land in which they live and can understand why such laws are necessary.

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WHY DO WE HAVE A GOVERNMENT AT ALL

The word government means first of all, guiding or steering. Then the government of any country means the management of that country, and it is needed, just as a family or a factory needs management. In all countries there are, and always have been, bad people who would harm themselves and others unless prevented. So one of the purposes of government is to prevent and to punish bad actions, and to protect the people who behave themselves properly. Without a government of some sort the strongest could do as they pleased and the weak would have no rights at all. The strong man might rob the weak and the helpless.

Then too the citizens of one nation must be protected from other states. You will find when you read the history of the world that people have never been satisfied to stay in the land in which they were born but have often tried to take other lands by force. There have been many wars for this reason, and a part of the duty of a government is to protect its citizens from outside attacks.

These two things, that is, to keep order in the land, and to protect the land and its people from outsiders, are the first and most important things a government has to do.

Other things which civilised governments do

There are many other things which the governments of civilised nations do which add to the health, the happiness, the wealth or the convenience of the people. For example all civilised governments now provide schools for the children, care for the poor and the insane, build bridges across streams, carry mails, make roads, pave streets, build lighthouses, and do many other things that you can name if you stop to think a moment.

Most countries are so large that they are divided into parts and sometimes these parts are again divided. As I am writing this article, four different governments are over me. First is the United States, then the state of New York, next the county of New York and finally the city of New York. Some of these have one part of the work of government and some do another. But it is with the first, or government of the United States, that we shall say most. Perhaps we may talk about the government of states and cities in another volume.

The kinds of government now found in the world

We find in the world today two kinds of governments, which are known as MONARCHIES and REPUBLICS. The word monarchy means the rule of one, while in a republic the people rule through men whom they choose for the purpose. These monarchies are of two kinds, known as absolute and limited, and the ruler holds the power for his life and then it passes to his child or nearest relative.

In an Absolute Monarchy the ruler, called a king, czar, emperor, or some such name, has the entire power. His word is law. Whatever he orders must be done, no matter how foolish or how cruel it is. There are few such governments now, though once there were many. In Turkey the people have recently gained a share in the government and in Russia they are struggling bravely to gain the right to speak.

In a Limited Monarchy, the power of the ruler is limited, or lessened, by a constitution which tells what the ruler may do, and what he may not do. In some of these governments, as in the German Empire, the ruler still has great power. In others, such as England, he has very little, very much less than the President of the United States. In all the limited monarchies the people have a large share in the government.

In a Republic the people have the power, which they give for a short time to officers elected by them, and to others chosen to represent them. If they think that an officer has not acted wisely or properly they can turn him out at the next election, or can bring him to trial before the end of his term.

The government of the United States

The United States is a republic. The plan of government is set forth in the Constitution, of which you were told on page 1389, and which is the "supreme law of the land." This means that no law can be made which is in opposition to the Constitution in any way; that no officer or judge may do anything forbidden by the Constitution, and that he must do what is commanded by it.

The paper divides the government into three parts, the LEGISLATIVE, or law-making; the EXECUTIVE, which carries out the laws; and the JUDICIAL, which decides whether or not the laws have been broken. Each of these is independent of the others, and each of them helps to prevent the others from becoming too powerful.

The legislative power

The Legislative power is in the hands of Congress, which is made up of two houses. In one called the Senate, each state, large or small, has two members, who are elected by the legislature of the state. These Senators represent the people of the whole state and serve for six years. A senator must live in the state he represents,

must be thirty years old, and must have been a citizen nine years. The House of Representatives is made up of members elected from states according to population. Every ten years Congress decides how many Representatives there shall be in the House and then divides them among the states according to population. The state is then divided into as many districts as it has members. Several states have only one representative each, while New York has forty-two, and Pennsylvania, thirty-six. Members are elected by the people for a term of two years. A representative must have been a citizen seven years, must live in the state he represents and must be twenty-five years old.

The duties and powers of the houses are not quite the same. The House of Representatives chooses its president, who is called the Speaker, though he does almost no speaking; the Vice-President is the president of the Senate. No law can be made unless both houses approve, but every measure which has to do with taxation must be first passed by the House of Representatives, and then sent to the Senate. This is because the Representatives were supposed to be closer to the people, who dreaded giving the power to tax to anybody because of their experience before the Revolution.

The Senate has some powers which the House has not. It shares with the President the power to make treaties or other agreements with foreign nations; it must approve of the men the President selects for high offices; and if the President or other high officers are charged with crimes, the Senate sits as a court to try them.

THINGS CONGRESS IS ALLOWED TO DO

The Constitution tells what kinds of laws Congress may make and what kinds are forbidden. For example, Congress may borrow money. This it does by issuing bonds, which are promises to pay a sum of money at some future time. Congress may make laws about trade, may coin money, make laws to punish imitators of this money, and may establish post-offices.

Congress is also given power to make war; and to raise and support armies. Here the fear the people had of a standing army caused them to say that all money voted for an army must be for two years or less. At the end of that time, the money must be voted again. Some other things Congress may do, are to build and keep a navy, make laws for the capital city, erect forts and do all other things which are necessary to carry out the Constitution.

THINGS CONGRESS MAY NOT DO

On the other hand Congress was forbidden to do many things. It could not forbid the slave trade for twenty years, nor lay any tax on goods sent out from any state. This last provision was put in because every state was jealous of the others and feared that Congress might tax unjustly the goods produced by that state. It was also forbidden, for the same reason, to give the seaports in any state any advantage over those of another.

The people feared that some attempts to make one class of people higher in rank than another would be made, so they forbade Congress to give any title of nobility, and also forbade any officer of the United States to receive any present or title from any foreign government, for fear that he might be influenced. It was forbidden also to pass any act declaring a man guilty without a trial, or to pass a law to punish a deed after it had been committed.

THE EXECUTIVE POWER, AND THOSE WHO HOLD IT

The chief officer of this part of the government is the President, chosen for four years. There is nothing in the Constitution to prevent the election of any man for as many terms as the people desire, but since Washington and Jefferson each refused to serve more than eight years, it has been the custom to elect no man more than two terms.

The President and the Vice-President are not voted for by the people.

At the time of the adoption of the Constitution there were no quick ways of travelling or of spreading news. There were few newspapers and the people of one state knew so little of those in other states that it was thought impossible for the people generally to know enough about the great men of the country to make a proper choice. So it was decided to have the people of a state select a number of prominent men equal to the number of their Senators and Representatives taken together. These men, called electors, were then to meet and choose a President and a Vice-President. The same custom is kept up now but it is known at the time the electors are chosen exactly how they will vote. Therefore, though we do not vote directly for the President and Vice-President, it amounts to the same thing.

Who can be President of the United States

The President must be a "natural born citizen of the United States," and must be thirty-five years old. As it has turned out nearly all of our Presidents have been over fifty years old when elected. If he should die or become unable to serve, the Vice-President takes his place, and so, of course, the same rules must apply to choosing a Vice-President. Congress was given power to decide who shall be President in case both President and Vice-President die, and has done so by making the members of the Cabinet the successors. So far in our history, both President and Vice-President have not died in the same term.

The President is Commander-in-Chief of the army and navy, though no president has ever taken the field in person. He appoints all the officers above the rank of colonel, and decides which one shall be in charge of the army. Lincoln always took great interest in all the plans of the generals and often changed them. The President also has power to grant pardons except in cases of impeachment. This means that even though a man has been convicted and sent to prison the President can release him, if he has broken a law of the United States. With the laws of a state the President has nothing to do.

The President has power to make treaties, that is, agreements with foreign nations, but two-thirds of the Senate must approve before they become law. With the consent of the Senate he also appoints ambassadors, ministers and consuls to represent the nation in foreign countries. He also appoints United States judges, and thousands of other officers not otherwise provided for, but the consent of the Senate is necessary here also.

The President is instructed to give to Congress every year information on the state of the Union together with his recommendations. Both Washington and Adams visited Congress in person and spoke. Jefferson was a poor speaker and sent his recommendations in writing. Every President since has followed his example. This is called the President's Message, but Congress is not required to pay any attention to it. The President and all other officers can be removed from office by impeachment. One President, Andrew Johnson, was impeached but was declared not guilty. Enough has been said to show that the President is a very powerful ruler — much more powerful than most of the kings in the world. Yet there is little danger of any president becoming a dictator or a tyrant. He cannot control the other parts of the government, and the people can turn him out before he becomes too powerful.

The advisers of the President

The Constitution does not say anything about the advisers of the President, now called his Cabinet, except to say that he may consult with the heads of the departments. At present there are nine of these Cabinet officers. Congress at first only created three heads of departments called the Secretaries of State, of the Treasury, and of War. The Attorney General was not considered a head of a department in the beginning. Since that time the Navy Department, which controls the warships and all concerning them, has been created. The Post Office, which

controls carrying and delivering the mails, existed from the beginning but was not considered a department until later.

The Interior Department has to do with public lands, Indians, the Patent Office, and pensions, while the Department of Agriculture collects and distributes information valuable to farmers and has charge of the Weather Bureau. This Weather Bureau studies rainfall, winds and climate, and predicts the weather in advance.

The last department organised is that of Commerce and Labour, which has charge of all matters belonging to commerce, mining, manufacturing, the fisheries, the census, the lighthouses and many other things. Though one of the newest departments it is one of the busiest.

THE JUDICIAL POWER

The Supreme Court is the highest court of the land. It has nine judges appointed by the President for life or good behaviour. Congress has also established circuit courts and district courts below the Supreme Court. They are entirely separate from the state courts, with which the United States has nothing to do unless the Constitution is violated. They try men who have broken the laws of the United States by such acts as robbing the mails, or using them to cheat; by making imitations, called counterfeits, of money; or by cheating the United States out of taxes. They have nothing to do with the laws of the states.

These courts also try cases between citizens of different states, cases having to do with sailors and ships, and the like. Where ambassadors are concerned, or where a state sues another state or the citizens of another state, only the Supreme Court can try the case. The Supreme Court can declare any act of Congress or of a state legislature to be "unconstitutional." If it does this, the act no longer has any authority, but is wiped out. This is a very great power which no other court in the world has. Both houses of Congress may pass an act, the President may sign it, and then it may be set aside by nine men or a majority of them.

Then the Constitution goes on to declare that all criminals shall be tried by a jury and that the trial shall be held in the state where the crime was committed. This provision was made because the people while colonists had seen their fellows tried by prejudiced judges and known the hardships of being taken from home for trial.

OTHER PROVISIONS OF THE CONSTITUTION

No state can treat the citizens of another state differently from its own, and if a criminal flees from his own state into another, the officers of the second state must give him up. No state can tax goods coming from another state, keep an army or navy, coin money, grant a title of nobility, or enter into any treaty.

New states may be formed by Congress but no state may be divided nor may two states or parts of states be joined without the consent of the legislatures. The small states had this inserted as in the beginning they feared that they would be joined to the larger states against their will.

The United States must see that each state has a republican form of government. This means that it is the duty of the United States to protect the rule of the people. Congress would prevent any man from making himself dictator of a state. The laws of Congress are above the laws of any state and if they disagree, the state must give way.

AMENDMENTS TO THE CONSTITUTION

It is made very difficult to change the Constitution, and very few changes have been made. The first ten amendments were added in 1791, the eleventh in 1798, the twelfth, in 1804, and the other three as a result of the Civil War. The first ten are really a part of the Constitution itself, and most of them grew out of the experience of the states before the Revolution.

One of them forbids Congress to make any law favouring or punishing any form of religion. Every man must have the right to worship as he pleases.

A man cannot be punished for his speeches or his writings unless they are intended to slander. In Russia today men are put in prison for their writings, and are not allowed to assemble in crowds without permission. Our Constitution says the people have these rights, which cannot be taken away by any officers.

You remember the Writs of Assistance which caused so much trouble before the Revolution. Such things are not allowed in the United States; nor can any man be tried twice for the same offence; nor can he be compelled to testify against himself; nor can private property be taken unless it is paid for.

Every criminal is entitled to a trial by jury, and has the right to hear the witnesses against him. No man can be tried in secret, nor shall excessive fines be imposed nor cruel or unusual punishments be inflicted. The government, for example, would not allow any state to punish a crime by cutting off the ears or by branding with a hot iron as once was done in several of them and in Europe also.

THE CIVIL WAR AMENDMENTS WHICH ABOLISHED SLAVERY

The Civil War amendments began in 1865 with the thirteenth, which abolished slavery in the United States. This was followed by the fourteenth, in 1868, which declared the negroes to be citizens and forbade the payment of any of the Confederate debt, or any payment for the loss of any slaves.

The fifteenth and last amendment, adopted in 1870, gave votes to the negroes by forbidding any state to deny any citizen the right to vote "on account of race, colour, or previous condition of servitude." Since that time many amendments have been proposed, but none have been adopted. One of the proposed amendments gave the right of electing senators to the people instead of to the legislature. Another would allow Congress to lay a special tax on incomes, while still another would change the beginning of the president's term from March 4th to April 30th, the date of Washington's inauguration.

WHAT THE CONSTITUTION WAS INTENDED TO DO

While the Constitution was intended to give the people the right to govern themselves, it was not intended to give the party, which happened to be in the majority in any year, the right to do everything it wished. As you have seen, Congress is permitted to do many things, but at the same time it is forbidden to do many other things.

Many of the things Congress is forbidden to do are those under which the colonies had suffered during British rule. They are the things which a strong and powerful part of the people might do to a weaker part. For example, Congress may not declare any man guilty without a trial, though such a habit had been common in Europe, nor may it lay taxes on the goods produced in any state. The Constitution was intended to protect the rights of the weaker side.

THE CONSTITUTION TO-DAY

For nearly a hundred and twenty-five years, the Constitution has been in operation. During the time we have grown from a nation of four million people into one of nearly a hundred million; from a union of thirteen feeble states into a great nation of forty-eight states with possessions in both the Old and the New Worlds. The plan of government has served us well and seems to be still strong. Yet we must realise that the history of our country is very short as the historian counts time. Other nations have existed for hundreds and even thousands of years and have then fallen. We must acknowledge that, as yet, our government is an experiment. Never before has the attempt to give the people authority to govern themselves been tried on so large a scale. Thus far the plan has succeeded wonderfully well, and for much of the success the Constitution is responsible. It prevents hasty changes, and at the same time allows the will of the people to express itself when the people have finally decided what they want.

CONTINUED ON PAGE 1819.

THE WAVERLEY NOVELS

WE have already read the first of these famous stories, "Waverley," and we now take up two others of the same series: "Rob Roy" and "Guy Mannering." "Rob Roy," as to its plot, is one of the least satisfactory of Sir Walter Scott's novels. But it contains one of his most charming characters in Diana Vernon. Like Flora MacIvor in "Waverley," she is an enthusiastic Jacobite. The other noteworthy characters in the story, apart from the hero, are Bailie Nicol Jarvie, the kind-hearted but prejudiced and comfort-loving magistrate, and Andrew Fairservice, the humorous Scots gardener, who becomes the hero's servant. "Guy Mannering," one of the best of the novels, contains in the portrait of Colonel Mannering a picture of the author himself; and in Dominie Sampson, a world-famous study of a man, who, though ungainly in person, uncouth in speech, and full of ponderous and largely useless learning, was so devoted to the family that befriended him as to win general regard.

DIANA VERNON'S SECRET

From the Story of "Rob Roy"

CONTINUED FROM 1498

FRANCIS OSBALDISTONE, the hero of "Rob Roy," is the son of an English merchant. Like Waverley, he becomes unwittingly involved in Jacobite intrigues. Escaping into Scotland, he enters the country of Rob Roy, the outlawed Highland chieftain—that between Glasgow, Stirling, and Ben Lomond—in search of documents on which the credit of his father's firm depends. In this quest he is befriended by the outlaw, after whom the novel is named. The story is written in the first person, and is supposed to be told by Francis Osbaldistone.

Rob Roy Macgregor Campbell was originally a cattle-drover. As a result of certain speculations, for which he had borrowed money from the Duke of Montrose, his lands were seized, his property was plundered, and his wife and children were turned adrift in midwinter. He then declared open war on the duke. The year in which we meet him in the pages of Scott's novel is that of the first Jacobite rising of 1715.

Frank Osbaldistone first met Diana Vernon at the house of his uncle, Sir Hildebrand, in the Cheviot Hills. She was the niece of Sir Hildebrand, who had six sons, among them Rashleigh. Soon after his arrival at his uncle's seat, Frank Osbaldistone was informed, to his chagrin, that by a special family arrangement "Die" Vernon was to marry one of the sons of Sir Hildebrand. Of these Rashleigh was a Richard III. in appearance—"in all but his humpback." Of his brothers, Percival was a drunkard; Thorncliff, a bully; John, a boor; Richard, a gambler; Wilfred, a fool; Rashleigh was the scholar. They all met with untimely deaths.

Contemptuous of his male companions at the Hall, but piqued by jealous suspicion of the proffered friendliness of Die Vernon, Frank made too free with the wine-cup, and, striking the sneering Rashleigh, had drawn his sword on Thorncliff, when the two were separated by the others. Repentance came with the morning, when all except Thorncliff and Rashleigh endeavoured with clumsy kindness to remove the painful impression of the previous evening.

Invited by Die to the library, Frank was cross-questioned at considerable length as to what Rashleigh had said about her. After trying by all the means in his power to evade direct questions, he was at length compelled to admit that Rashleigh had told him the arrangement by which she was to marry Thorncliff.

"But, besides all this," pursued Diana, "Rashleigh said something of himself with relation to me. Did he not?"

"He certainly hinted that were it not for the idea of supplanting his brother,

he would now, in consequence of his change of profession (he was to go into an office instead of the Church) be desirous that the word Rashleigh should fill up the blank in the dispensation instead of the word Thorncliff."

DIANA IS TOLD OF THE FALSENESS OF RASHLEIGH OSBALDISTONE

"Ay? Indeed?" she replied. "Was he so very condescending? Too much honour for his humble handmaid, Diana Vernon. And she, I suppose, was to be enraptured with joy could such a substitute be effected?"

"To confess the truth, he intimated as much, and even further insinuated ——"

"What? Let me hear it all!" she exclaimed hastily.

"That he had broken off your mutual intimacy, lest it should have given rise to an affection by which his destination to the Church would not permit him to profit."

"I am obliged to him for his consideration," replied Miss Vernon, every feature of her fine countenance taxed to express the most supreme degree of scorn and contempt. She paused a moment, and then said, with her usual composure: "There is but little that I have heard from you which I did not expect to hear, and which I ought not to have expected; because, barring one circumstance, it is all very true. But as there are some poisons so active that a few drops, it is said, will infect a whole fountain, so there is one falsehood in Rashleigh's communication powerful enough to corrupt the whole well in which Truth herself is said to have dwelt. It is the leading and foul falsehood that, knowing Rashleigh as I have reason too well to know him, any circumstance on earth could make me think of sharing my lot with him.

THE ROMANTIC POSITION OF THE WINSOME DIANA VERNON

"No," she continued, with a sort of inward shuddering that seemed to express involuntary horror, "any lot rather than that—the sot, the gambler, the bully, the jockey, the insensate fool, were a thousand times preferable to Rashleigh—the convent, the gaol, the grave shall be welcome before them all."

"There was a sad and melancholy cadence in her voice, corresponding with the strange and interesting romance of her situation," the narrator goes on to say. "So young, so beautiful, so untaught, so much left to herself, and deprived of all the support and protection of female friends, it is scarce metaphorical to say that my heart bled for her. Yet there was an expression of dignity in her contempt of ceremony—of upright feeling in her defiance of falsehood—of firm resolution in the manner in which she contemplated the dangers by which she was surrounded, which blended my pity with the warmest admiration. She seemed a princess deserted by her subjects, and deprived of her power, yet still scorning those formal regulations of society which are created for persons of an inferior rank; and, amid her difficulties, relying boldly and confidently on the justice of Heaven, and the unshaken constancy of her own mind. I offered to express the mingled feelings of sympathy and admiration with which her unfortanate situation and her high spirit combined to impress me, but she imposed silence on me at once."

THE BRAVE WORDS OF A TRUE HEROINE OF ROMANCE

"I told you in jest," she said, "that I disliked compliments—I now tell you in earnest that I do not ask sympathy, and that I despise consolation. What I have borne, I have borne. What I am to bear I will sustain as I may; no word of commiseration can make a burden feel one feather's weight lighter to the slave who must carry it. There is only one human being who could have assisted me, and that is he who has rather chosen to add to my embarrassment, Rashleigh Osbaldistone.

"Yes! the time once was that I might have learned to love that man, but what should I have been in this world, and the next, in body and soul, had I fallen under the arts of this accomplished villain! He bears a charmed life; you cannot assail him without endangering other lives, and wider destruction. Had it been otherwise, in some hour of justice he had hardly been safe, even from this weak hand. I told you," she said, motioning me back to my seat, "that I needed no comforter. I now tell you I need no avenger."

Rashleigh, soon after Miss Vernon had thus taken Frank into her

DIANA VERNON AND THE MYSTERIOUS GLOVE

In the romantic story of Diana Vernon, the charming heroine of Scott's stirring tale "Rob Roy," the manly young hero, Francis Osbaldistone, who is in love with Diana, is greatly disturbed by finding in the library a strange glove, which he knows must belong to someone who has visited Diana, and her explanation scarcely clears his mind from care; but she has a good reason for keeping the secret of the glove, as we shall find when we read the story.

confidence, left to take up the position in Mr. Osbaldistone's office which Frank himself had abandoned. The studies which Miss Vernon had begun with Rashleigh, she now resumed with Frank for her companion. Frank also began to take some interest in a priest, Father Vaughan, who appeared to divide his time between Osbaldistone Hall and about half a dozen mansions of Roman Catholic gentlemen in the neighbourhood. About this priest there was some mystery. He seemed to enjoy the complete confidence of both Diana and Rashleigh.

At the end of a few months' time, during which he received no word from his father, Frank learned from Miss Vernon that Mr. Osbaldistone had gone to Holland, leaving all his affairs in the hands of Rashleigh. This news was imparted in the library, and accompanied by the advice that Frank should go to London and see his father's confidential clerk. Whilst they were talking Frank saw the tapestry shake that covered the door of the secret passage from Rashleigh's room, and Diana asking him to leave her, he did so with mingled feelings.

THE MYSTERY OF THE SECRET PASSAGE BEHIND THE TAPESTRY

Convinced that Miss Vernon was secretly receiving a rival, Frank decided to discover who the stranger was. He convinced himself that he was justified in doing this on the ground that it would be a service to Sir Hildebrand, "who was probably ignorant of the intrigues carried on in his family," and a still greater service to Miss Vernon, "whose frank simplicity of character exposed her to so many risks in maintaining a private correspondence, perhaps with a person of doubtful or dangerous character."

Frank discovered a man's glove in the library, and learned from Miss Vernon that it belonged to one whom she honoured, but was refused further information on this point.

While his mind was still disturbed with this discovery, Frank received a letter informing him that his father was in grave financial trouble, and that Rashleigh had left London for Glasgow with certain valuable papers. Owen, the confidential clerk, had been despatched to Glasgow to find Rashleigh, and Frank was asked to follow him. It was necessary for Mr. Osbaldistone's credit that the funds in Rashleigh's possession should be recovered by a certain day, the 12th of September. On learning this, Miss Vernon, in bidding Frank farewell, put a packet into his hands, instructing him what to do with it.

THE HERO RECEIVES A SEALED PACKET FROM DIANA AND BIDS HER FAREWELL

"Take this packet," she said. "Do not open it until other and ordinary means have failed. If you succeed by your own exertions, I trust to your honour for destroying it without opening or suffering it to be opened. But if not, you may break the seal within ten days of the fated day, and you will find directions which may possibly be of service to you. Adieu, Frank; we never meet more, but sometimes think of your friend Die Vernon."

Frank set out for Glasgow with Sir Hildebrand's gardener, Andrew Fairservice, as his attendant. Very shortly after his arrival in Glasgow he was befriended by the fearless Rob Roy, to whom, when he opened Die Vernon's letter, he found that this epistle was addressed. His next adventure was an encounter with Rashleigh, from whom he was separated by Rob Roy.

In the Highlands he was arrested on a charge of conspiracy, a charge which his connection with Osbaldistone Hall and the fact that he was found to have been in communication with Rob Roy supported. But eventually all came right. Frank recovered the missing assets, and, what made equally for his peace of mind, he found out that the person who had been secreted at Osbaldistone House was Die Vernon's own father, a prominent Jacobite, who had taken the name of "Father Vaughan" as a disguise.

FRANCIS OSBALDISTONE COMES TO HIS OWN, AND ALL ENDS HAPPILY

At first Rashleigh had espoused the Jacobite cause, but when he found that his suit was rejected by Diana, he went over to the other side, and his treachery to Frank's father was followed by even worse treachery to the Vernons. He also behaved infamously to Rob Roy. But punishment was meted out to him in the end, and all ended happily with the succession of Frank to the Osbaldistone estates and his marriage to Diana.

THE SMUGGLER'S REVENGE

Being the Romantic Tale of "Guy Mannering"

It was in the beginning of the month of November, 17—, when a young English gentleman, who had just left the University of Oxford, made use of the liberty afforded him to visit some parts of the North of England; and curiosity extended his tour into the county of Dumfries. Losing his way one night, he found a hospitable welcome at the hands of Godfrey Bertram, the laird of the impoverished estate of Ellangowan. The young Englishman was Guy Mannering. His arrival happened at the time of the birth of an heir to the house of Ellangowan.

He stayed long enough to make the acquaintance of his host's companion, Dominie Sampson, "a poor, modest, humble scholar, who had won his way through the classics, but fallen to the leeward in the voyage of life"; and Meg Merrilees, a half-crazy woman, who was as devoted as the Dominie to the house of Ellangowan, and who was regarded by the band of gipsies in the locality as an extraordinary woman, gifted with supernatural powers.

MEG MERRILEES DENOUNCES THE LAIRD FOR HIS TREATMENT OF THE GIPSIES

Another incident in Guy Mannering's stay at Ellangowan was his encounter with one Dirk Hatteraick, a smuggler, who appeared to be in league with Meg Merrilees and the gipsies. About this time Godfrey Bertram was made a Justice of the Peace, and one of the first uses he made of the power thus conferred upon him was to eject the gipsies from a spot called Derncleugh. This action brought down upon him the curse of Meg Merrilees, whose nephew had been given up to the press-gang, but who still preserved her devotion to the laird's son, little Harry Bertram, "one of the most lovely children who ever made a sword and a grenadier's cap of rushes." Harry's education was entrusted to the Dominie, and these two were always together.

When he had moved on the gipsies, the laird set to work against the smugglers. This work was taken up with much energy by an excise officer, named Frank Kennedy. One day Dirk Hatteraick's lugger was chased by a revenue vessel, and the smugglers only escaped by setting fire to their lugger, and taking to their boats, near a headland known as Warroch Point.

It happened that the Dominie and his young charge were walking in this direction when they were overtaken by Kennedy. The child, seeing that Kennedy was mounted, reminded him of a promised ride. The officer took the boy with him, whilst the Dominie, satisfied that his pupil was in safe hands, returned to the house.

HOW THE GIPSIES KIDNAPPED THE YOUNG HEIR TO THE LANDS OF ELLANGOWAN

The next time Kennedy was seen, he was lying dead at the foot of the cliff. At the summit of Warroch Point were signs of a struggle. But no sign of the heir of Ellangowan was to be found anywhere. The gipsies were arrested, but no evidence of their complicity in the outrage could be discovered. That day a little sister to Harry Bertram was born, and the laird was left a widower.

Seventeen years later, Guy (now Colonel) Mannering, was once again in the vicinity of Ellangowan. His wife had died in India, and his daughter, Julia, was staying at the house of a friend in Westmorland. The colonel, who had returned from the East full of honours and a rich man, stopped at the village of Kippletringan, at the small but comfortable inn of the Gordon Arms, which was kept by Mrs. MacCandlish. Here he learned that creditors were in possession of the Ellangowan estate, which was about to be sold by auction. It appeared that one, Gilbert Glossin, a man who had risen by crooked means and whom the laird had befriended, was especially anxious to secure the property.

THE TRIUMPH OF A RASCAL AND THE SAD END OF GODFREY BERTRAM

The colonel, after communicating with the Sheriff-substitute MacMorlan, attended the sale. His old host the laird, now very feeble, was carried to the green before the old castle, so as to be out of sight of the "unco' spectacle" at the New Place. He was accompanied by his daughter, Lucy, and the

Dominie. The son of a neighbouring landlord, Charles Hazlewood, was also in sympathetic attendance, especially where Lucy was concerned. But all the precautions did not serve to ward off an encounter between the old laird and Glossin.

THE SAD END OF THE OLD LAIRD OF ELLANGOWAN

This had a terrible result in the sudden death of the laird, as a consequence of which the sale was suspended till Miss Bertram could consult with her friends. During this interval the colonel left the neighbourhood to visit his own daughter, and Lucy Bertram and the Dominie found refuge in the household of MacMorlan.

Owing to delay on the part of a messenger of the colonel, there was no bid against Glossin when the sale of Ellangowan took place, but people commented on the fact that had the heir but lived, the transfer would not have been possible.

Colonel Mannering's journey to Westmorland was due to a letter he had received from his daughter's guardian, Mr. Arthur Mervyn. In this epistle Mr. Mervyn alluded to Miss Mannering's apparent romantic attachment to some unknown musician, who serenaded her from the lake below Mervyn Hall. This nocturnal minstrel was known to Miss Mannering by the name of Brown. Brown had been a cadet in the colonel's regiment in India. His origin was obscure, but he was in other respects a young man of great promise. His attentions had been paid to Miss Mannering whilst he was in India. The colonel did not know this.

THE COLONEL FIGHTS A DUEL WITH HIS DAUGHTER'S SWEETHEART

He did not know either that Brown had been encouraged by Mrs. Mannering. Tales against him were brought to the colonel, and one day this gallant officer had called out the young man to a duel. Brown had fallen, and, a body of native marauders appearing after the first shots had been fired, Brown was left on the ground for dead. Ever since it had been a source of grief to the colonel that he had been so hasty.

At Mervyn Hall Miss Mannering learned that Brown still lived. Her lot was not regarded by herself as a happy one. Her guardian was thoughtful and kind, but she feared his wife. And the colonel's relations to her may be gleaned from the fact that she had been separated from her girl friend on account of an ungrammatical phrase in an Italian exercise and three false notes in a piece of music.

The colonel took a house—"Woodbourne"—near Ellangowan, and decided that his daughter should live with him there and have as a companion Lucy Bertram. As for the Dominie, whose life seemed to depend upon his remaining in attendance on the daughter of his old patron, the colonel decided that he should have the task of arranging his large library. The scene in which Colonel Mannering communicated this intention to Julia is very brightly described—Julia is writing to the friend from whom she had been separated.

COLONEL MANNERING'S AMUSING INTERVIEW WITH HIS LIVELY DAUGHTER

"I have now had an interview with my father, as confidential as, I presume, he means to allow me. He requested me to-day, after breakfast, to walk with him into the library: my knees, Matilda, shook under me, and it is no exaggeration to say I could scarce follow him into the room. 'Julia,' he said, 'my agent writes me from Scotland, that he has been able to hire a house for me, decently furnished, and with the necessary accommodation for my family—it is within three miles of that I designed to purchase.' Then he made a pause, and seemed to expect an answer.

"'Whatever place of residence suits you, sir, must be perfectly agreeable to me!'

"'Umph! I do not propose, however, Julia, that you shall reside quite alone in this house during the winter.'

"'Mr. and Mrs. Mervyn,' thought I to myself.

"'Whatever company is agreeable to you, sir——,' I answered aloud.

"'Oh, there is a little too much of this universal spirit of submission; an excellent disposition in action, but your constantly repeating the jargon of it puts me in mind of the eternal salaams of our black dependents in the East. In short, Julia, I know you have a relish for society, and I intend

to invite a young person, the daughter of a deceased friend, to spend a few months with us.'

"'Not a governess!' exclaimed poor I, my fears at that moment totally getting the better of my prudence.

"'No, not a governess, Miss Mannering,' replied the colonel somewhat sternly, 'but a young lady from whose excellent example, bred as she has been in the school of adversity, I trust you may learn the art to govern yourself.'

"'Is this young lady a Scotch woman, papa?'

"'Yes'—drily enough.

"'Has she much of the accent, sir?' her father is a very good sort of man, and I believe I shall make room for him in the house.'

"'Chaplain, papa? But will he read us the Church of England service?'

"The apparent simplicity with which I asked this question got the better of his gravity. 'Come, Julia,' he said, 'you are a sad girl, but I gain nothing by scolding you. Of these two strangers the young lady is one whom you cannot fail, I think, to love; the person whom, for want of a better term, I called chaplain, is a very worthy and somewhat ridiculous personage, who will never find out you laugh at him,

MEG MERRILEES CURSED THE LAIRD OF ELLANGOWAN AS HE RODE BY

"'Much——!' answered my father hastily. 'Do you think I care about a's and aa's, and i's and ee's? I tell you, Julia, I am serious in the matter. . . . I have resolved that this young lady shall be a member of my family for some months, and I expect you will pay her that attention which is due to misfortune and virtue.'

"'Certainly, sir.'—After a pause.—'Has she any attendant? Because, you know, I must provide for her proper accommodation if she is without one.'

"'N-no—no—not properly an attendant—the chaplain who lived with if you don't laugh very loud indeed.'

"'Dear papa! I am delighted with that part of his character. But pray, is the house we are going to as pleasantly situated as this?'

"'Not, perhaps, as much to your taste—there is no lake under the windows, and you will be under the necessity of having all your music within doors.'

"This ended the keen encounter of our wits; for you may believe, Matilda, it quelled all my courage to reply."

Later, when the Mannerings, Miss Bertram, and the Dominie were

together at Woodbourne, the colonel took an opportunity to ask his daughter how she liked their guests.

"Oh," was the reply, "Miss Bertram of all things. But this is a most original parson—why, dear sir, no human being will be able to look at him without laughing."

"While he is under my roof, Julia, everyone must learn to do so."

"But, papa, the very footmen could not keep their gravity!"

"Then let them strip off my livery," said the colonel, "and laugh at their leisure. Mr. Sampson is a man whom I esteem for his simplicity and benevolence of character."

"Oh, I am convinced of his generosity, too," said this lively lady; "he cannot lift a spoonful of soup to his mouth without bestowing a share on everything round."

COLONEL MANNERING SAYS A GOOD WORD FOR DOMINIE SAMPSON

"Julia, you are incorrigible; but, remember, I expect your mirth on this subject to be under such restraint that it shall neither offend this worthy man's feelings nor those of Miss Bertram, who may be more apt to feel on his account than he on his own. And so, good night, my dear; and recollect that, though Mr. Sampson has certainly not sacrificed to the graces, there are many things in this world more truly deserving of ridicule than either awkwardness of manners or simplicity of character."

The reader, like Miss Mannering, will surely arrive at the same conclusion as Colonel Mannering.

Brown, unaware of the cause of the colonel's dislike, found his way to the vicinity of Woodbourne. After meeting with Meg Merrilees, he encountered Miss Mannering, Miss Bertram, and Mr. Hazlewood, when these three were out walking. On seeing him so unexpectedly, Julia screamed. Mr. Hazlewood mistook the scream as one of fright, and Brown's appearance, owing to a midnight adventure, was not of a kind to arouse confidence at first sight.

Consequently young Hazlewood raised a gun he was carrying and, pointing it at the man he regarded as a smuggler, threatened to fire at the intruder if he did not move away. Stung by this treatment, Brown sprang at Hazlewood with the intention of taking the gun from him. The weapon went off in the scuffle, Hazlewood was wounded, and, the screams of the women bringing assistance, Brown made his escape from the scene.

THE LOST HEIR TO THE HOUSE OF ELLANGOWAN IS FOUND AT LAST

His case now seemed a hopeless one, especially as evidence was found of his relations with Meg Merrilees, and the gipsies had attacked Colonel Mannering's house. After a series of other adventures he was arrested by Gilbert Glossin, charged with an attack on young Hazlewood. Glossin quickly identified him with Harry Bertram, the missing heir of Ellangowan, and schemed to have him carried off by the smugglers, so that he, Glossin, might continue at Ellangowan. But others, Meg Merrilees included, had discovered that Brown and Bertram were one and the same person, and eventually he was restored to his own and his wrongs were righted.

It appeared that when the smugglers attacked and killed Frank Kennedy at Warroch Point, the child's life was saved at the intercession of Meg Merrilees. But the boy was taken to Holland. There he found a protector, and thence he made his way to India, still ignorant of his parentage. After Colonel Mannering's return to England, Brown, as young Bertram was called after his patron in Holland, was given a captaincy. Glossin was a party to the kidnapping at Warroch Point, and Glossin all but succeeded in getting rid of the heir to the estates he had bought. But his ill deeds found him out, and he died miserably—an example of a man whose natural gifts, rightly used, should have brought him both riches and honour.

HOW COLONEL MANNERING BECAME ONE OF THE HAPPIEST MEN ALIVE

Misunderstandings were happily cleared away between Colonel Mannering and Harry Bertram, and when Julia became the latter's wife, the colonel was among the happiest of men. His delight even rivalled that of the Dominie. And with the announcement of a wedding between Charles Hazlewood and Lucy Bertram the story ends.

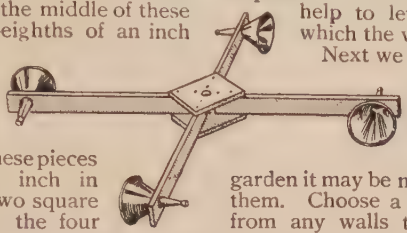
The next story of Famous Books is on 1645.

MAKING A TOY TO MEASURE THE WIND

CONTINUED FROM 1512

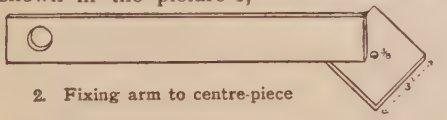
ANY boy can make an interesting toy that will enable him to appreciate the force of the wind, and even, to some extent, to tell the speed of the wind. The first things required are two pieces of wood 3 inches square and half an inch thick. Through the middle of these make a hole about three-eighths of an inch in diameter. Now take four pieces of wood 15 inches long, 2 inches wide, and half an inch thick, as seen in picture 3. Near one end of each of these pieces make a round hole 1 inch in diameter. Now nail the two square pieces to the edges of the four long pieces in position shown in the picture 1, keeping the inside ends of the long pieces a little distance away from the hole in the middle of the square pieces. Picture 2 shows the first stage in this operation. Care must be taken to make the four pieces exactly at right angles, and we may see if we have done so by measuring the distances from tip to tip of any two adjoining ones. These distances should be all alike. We now have something resembling somewhat the top of a signpost at two cross-roads. We can paint it any colour we like, so that the wind-speeder, as we will call it, may stand the weather, for it is to do its work in the open air.

We now get four tin funnels or fillers, 4 or 6 inches diameter at the mouth, and into the spout of each put a cork that will close the end. These funnels we place in the round holes which were made near the tips of the wooden arms. They must be put in all from the sides, as seen in picture 1, so that the wind will blow into the mouth of each in turn, as the arms spin around. The funnels should be pushed in tightly, and string may be used to tie them into place. Each funnel may be painted a different colour, and this will help to let us judge the speed at which the wind blows them around.

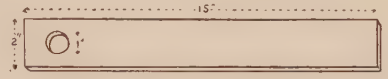


1. Speeder ready for mounting

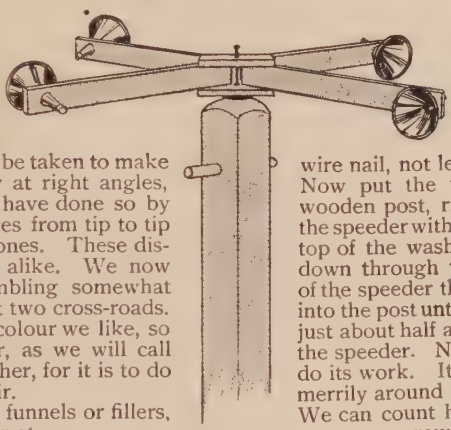
Next we require a post erected in the garden, so that the revolving speeder may be mounted on top of it. If there are any wooden clothes-posts in the garden it may be mounted on top of one of them. Choose a post as far as possible from any walls that would prevent the wind from having a free course to reach the speeder.



2. Fixing arm to centre-piece



3. One of the four arms



4. Speeder ready for work

The next thing is to get a washer—that is, a small flat ring of iron with a hole of, say, half-inch size. Washers are very cheap. We shall also want a round wire nail, not less than 5 inches long. Now put the washer on top of the wooden post, right in the middle, put the speeder with its arms and funnels on top of the washer, and drive the nail down through the hole in the centre of the speeder through the washer and into the post until the head of the nail is just about half an inch above the top of the speeder. Now we can let the wind do its work. It will send the speeder merrily around when it blows briskly. We can count how often the arms go round in a minute, and the different colours of the funnel will enable us to count the revolutions easily. If we find that one day the revolutions are more per minute than on another day, we can tell that the wind is stronger, and if the revolutions are fewer the wind is not so strong.

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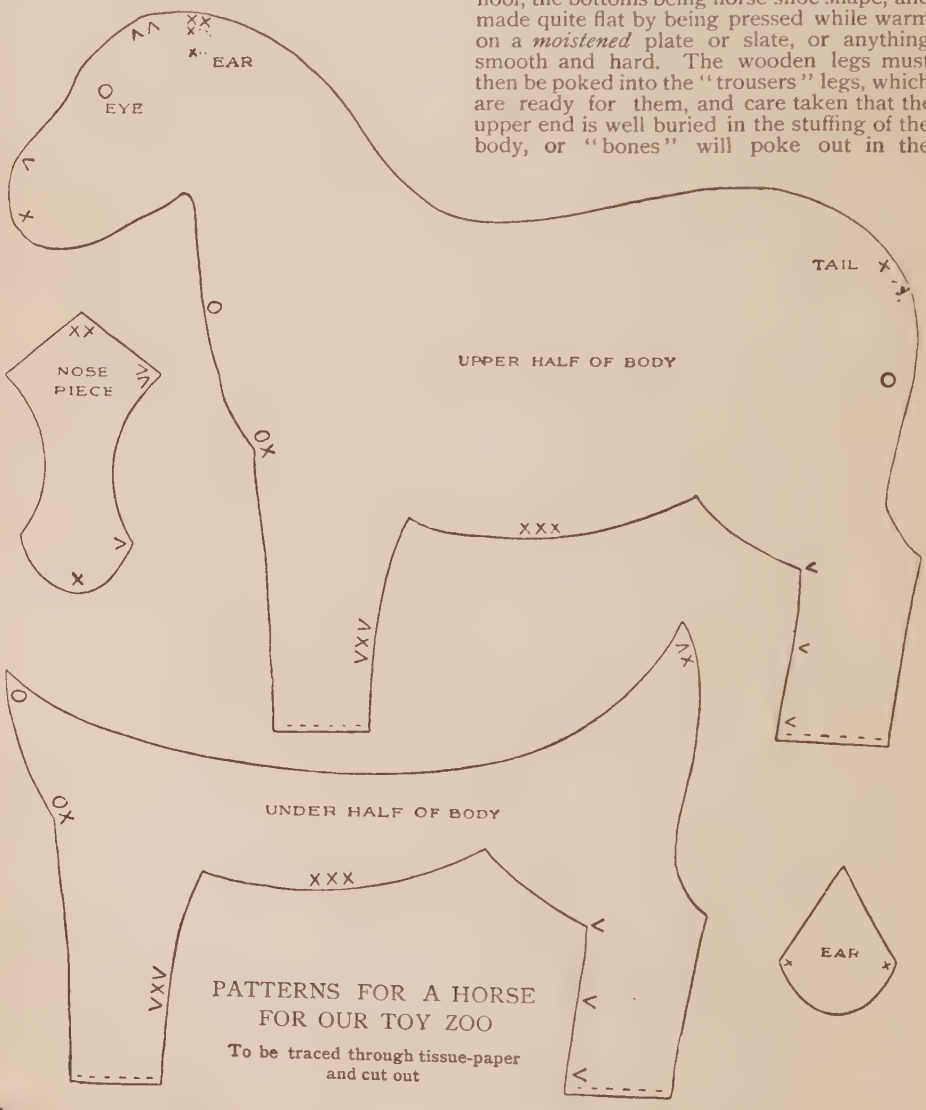
THE HORSE FOR OUR TOY ZOO

OUR horse is made of brown velveteen, although good sateen looks very nice, and both, being materials likely to fray, have to be everywhere turned in at the raw edge. The colour of the thread should match that of the material if possible.

The fitting in of the nose-piece is the most difficult part in making the horse; but if you put the point in the nose-piece on the top of the horse's head, and stitch the edge to the edge down past vv to v and x, taking no notice at all of the difference in shape, but making the edges come together, with the neatest possible work, it will not be difficult. This is the first thing to do—fastening the piece to both sides of the face, and then joining up from chin to throat. In stitching up the legs, leave the bottoms open at the dotted line.

When the horse is finished, and the body and thighs stuffed, it is well, when sewing up the under seam, to leave about an inch open in a convenient place for adding a little more wadding, if required, to the upper part of the legs.

In the horse's legs we need four sticks of wood, each about as thick as a slate pencil. The hind legs take three and a quarter inches, and the front legs two and three-quarter inches. Smooth off the sharp corners, and pare the wood down a little at the hoof end. These ends must each be well covered with good glue, moulded to the shape of a hoof, the bottoms being horse-shoe shape, and made quite flat by being pressed while warm on a *moistened* plate or slate, or anything smooth and hard. The wooden legs must then be poked into the "trousers" legs, which are ready for them, and care taken that the upper end is well buried in the stuffing of the body, or "bones" will poke out in the



haunches, and make the horse look starved.

The bottoms of the "trousers" must be turned in, and sewn very tightly with double thread just above the hoof, winding the thread round several times before fastening off. Push the extra piece of stuff in the "trouser" to the back part of the hoof, where it will form the fetlock. Then shape the leg by pulling the stuff very tightly round it about three-quarters of an inch above the fetlock, and sewing it together on the *inner* side of the leg for about another three-quarters of an inch to make the thin part of the leg. Above this part let it come wider again, and for the front legs poke in from above enough wadding to make this wider part look plump, and keep the wood from showing through the stuff.

The inner side of the horse's legs

On the inner side, which is a good deal out of sight, the leg looks like the little sketch (A) shown here. The stitches are made extra large that you may easily see where they should be. The hind leg has a little more work in it, because we have to make it poke out where the big joint is. This is allowed for in the cutting, but must be shown quite plainly by stitching in the stuff close to the wood just here, leaving the corner bit sticking out.

The horse for our toy Zoo

There is another little sketch on this page (B) which makes this quite clear. These extra stitches are carried right through from the inner to the outer side of the leg. Make the thigh part of the hind leg as plump as possible, poking tiny bits of wadding in through the hole left in the under seam, until the wood cannot be seen anywhere.

The horse's tail is about a square inch of material turned in and folded and stitched to about the thickness of a pipe-stem round a bunch of brown worsted or silk, from three to five inches long. The upper end is then rounded off, turned under and hemmed, single, into position as the picture shows.

The mane, of worsted or silk, is about two and a half inches long. It is sewn on in double tufts, like the lion's mane. The ears are made double and turned, like the cat's and tiger's ears, but they are narrower and more pointed. The openings are towards the face.

The eyes are made of black beads, and the nose is marked in black worsted or silk along the joins of the nose-piece, giving a few extra stitches, just like the sketch, to show the large nostrils.

If we are good at drawing, the pattern of the horse given here should be enlarged from the copy to 5¾ inches from O on the chest to O at the tail; while from XX on the top of the head to the bottom of the front leg should be 5⅞ inches, making all the other parts, of course, in proportion. If this is done the horse will be much more easily made and the effect better in every way.

HOW DID THE FROGS JUMP ON THE TUMBLERS?

HAVE you seen little frogs jumping about in the grass near a pond, or springing away from under the leaves when you go to find strawberries in the strawberry bed? How easily they jump! See if you can find out how they jump on tumblers in this puzzle.

Sixty-four tumblers are arranged on a table in the form of a square, as shown in the picture, eight along each side and the others in rows between. Eight of the tumblers have frogs sitting on them.

Now, three of these frogs are going to jump on to other tumblers without frogs on them, but they must jump on to tumblers where they will still *not be in a line with another frog*, neither upwards, downwards, crossways, nor sideways. The dotted lines in the picture show how the lines go sideways.

A frog may not jump on to a tumbler where another one is already seated, nor on to one which has already had a frog seated upon it. There are so many tumblers to choose from that it seems there must be many vacant seats for the three frogs that want to jump; but remember that *no two frogs may jump on to tumblers in the same line.*

This problem of the frogs is given in Mr. Henry Dudeney's book of Canterbury Puzzles.

The way the frogs jumped is explained on page 1619.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO IN THE MIDDLE OF SEPTEMBER

Our summer work in our little garden plots is rapidly drawing to a close; but the autumn is a very busy time for all keen gardeners. In fact, the autumn work is even more important than the spring work, and many of our spring flowers have to be planted at this season.

Just at present, however, our gardens are, or they ought to be, bright and beautiful, and so full of plants that there is little or no room for planting or sowing. For all that, we must not be idle. Very likely you put away your pots in the spring when you planted out your geraniums, fuchsias, and other flowers that you keep in the house through the winter. Now, you must make it a rule never to plant anything in a dirty or green pot. It is quite easy to get rid of the green mossy growth—a scrubbing-brush and some water will soon do the work—but before using the pots they must be perfectly dry. When new pots are bought they should be soaked in water and allowed to dry before being used.

In some of them the old geraniums and other plants may be potted up when we begin to fear frosts; but long before this is necessary, and, indeed, at once, we may pot up some bulbs to flower very early in the spring if we have a window in the house, or a corner of the conservatory in which to place them.

A bed of violets

If we have six pots in which to grow bulbs, we may put in the crocks—never plant without these at the bottom of the pots, or the plants will not thrive—and for soil we may take about equal parts of leaf-mould, loam, and silver sand—rather less of the sand—and mix all carefully together. The pots may be filled, and the bulbs planted.

A capital selection of bulbs would be one pot each of Roman hyacinths, hoop petticoat daffodils, snowdrops, crocuses, tulips, and hyacinths of a larger and finer variety than the early flowering *Roman* hyacinths.

One of these larger hyacinths is enough for the pot, while three or four tulips, six crocuses, six snowdrops, four daffodils, or four or five Roman hyacinths are enough for a five-inch pot. If yet another pot were to be added it should be a pot of freesias, which, beside producing beautiful pale flowers, are also sweetly scented. Once the bulbs are safely and firmly potted we must keep them for some weeks in the dark. Either they must go down into a dark cellar, or we may invert another pot on each, place them on ashes, and cover them with ashes or dead leaves.

The reason for this darkness is wonderfully interesting. The bulbs, after being planted, have to grow in two directions, downwards from the base of the bulb in the form of roots, and upwards from the point of the bulb to form leaves. Now, as the roots find the nourishment of the soil and convey it to all parts of the plant, it will be quite clear that it is necessary to have root growth before top growth, so that this top growth, when it appears, shall be sufficiently nourished. The darkness encourages this root growth, and therefore, until the roots have been formed, say, in five weeks, we keep the pots containing the bulbs away from the daylight.

Freesias do not require this period of darkness, and are better without it.

All the pots need not be planted at the same time. The tulips and hyacinths, for instance, may be left until October, though the Roman hyacinths should be put in now, in order to flower in the winter.

You already know all about the summer treatment of your violets, and we will suppose that someone is going to give you the entire care of a frame of double violets for the winter. It will be a very interesting hobby, and a success if you only take the trouble to find out what the little plants need for their welfare. The time has come to put them in the frames, for there will be a better chance of success if they are established thus early before winter.

A frame six feet by four feet is excellent, and, if possible, it should be in a warm, sheltered position that gets as much of the sunshine as it can; that is to say, it should face the *south*. You can fill it nearly full of soil. But it may be that there is a difficulty in getting this amount of soil. In that case collect some dry dead leaves and more than half fill the frame with these. Now get into the frame and tread them down as firmly as possible, and on the top of them put quite a foot of soil. A good plan to know the depth of the soil you have put in is to mark on one of the outside boards the depth of the leaves. You can then tell the amount of soil.

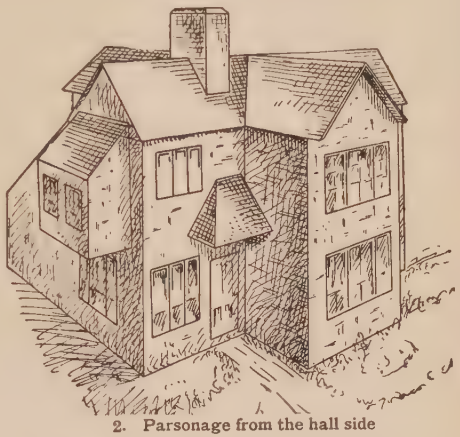
It is one of the most important points of growing violets in frames successfully to have the plants almost *touching the glass* when the lights are put into place. The frame is a good deal deeper on one side than the other, and, of course, the soil must follow the same line of slope. Make the soil firm and let everything settle down for a few days. After that you may lift your violet plants and get them into place. Plant so that they do not touch by some four inches or so, or a little less. Watering greatly helps in settling them. But for the present there is no need to put on the glass lights. If the dews should be exceptionally heavy they may be drawn on at night, but on no account must they be closed down—a piece of wood or brick should tip them up. Violets want air to flourish well.

MAKING A PARSONAGE FOR MODELTOWN

ONE of our most important buildings was the Modeltown Church. Next we built a chapel, which was much simpler and easier to make. Our present task is the building of a house for the minister to live in. This house will be called the parsonage, and we shall make it now. There will be more parts to add than there were in the chapel, so that the work will be a little more difficult.

General views of our parsonage are given in pictures 1 and 2. Picture 10 gives a plan of the building, and is made one-third scale, so that in taking our sizes from the picture we use scale-rule C, which was given away with THE CHILDREN'S ENCYCLOPÆDIA, and make the lines on our card with our full-sized scale-rule. We remember, of course, the explanation given on page 446 regarding the meaning of the three different kinds of lines in the plans, so that we need not go over the meaning of these lines again.

1. Modeltown Parsonage

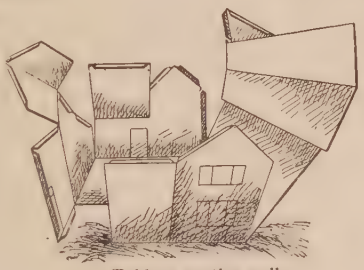


2. Parsonage from the hall side

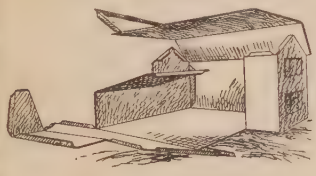
We draw on card and cut out the plan of the parsonage as shown in picture 10. As we bend it up into shape it will assume the position shown in picture 3. When we have glued the two sides to the back wall we shall have it like picture 4. Continuing a little further, we glue the triangular piece to the low sloping roof, and we see what it should be like in picture 5. Picture 6 represents a further stage, with one of the remaining walls glued to the low sloping roof, and finally picture 7 gives us a view of the framework glued together, leaving only one part to hinge open. We now see the meaning of the many curiously-shaped portions of the plan in picture 10. Every part has been carefully planned, and we find that many things which seemed at first to have no relation to each other fall into harmony and make a complete whole.

We shall now make and add a hall, with a bedroom upstairs. The plan of this part is given half-scale in picture 12. We therefore take our measurements with rule B, making our lines on the card with our full-sized rule. In bending up the hall before gluing, it will assume the position shown in picture 8. We glue the roof to the sides, and then we attach the whole piece to the place in the wall marked on the plan in picture 10, again using glue to fix it in position.

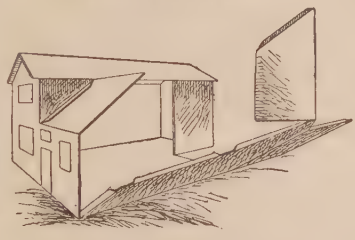
To the bedroom of the minister's study we shall attach a projecting extension, which will provide room for a nice window-seat and also extend the view obtainable. The plan of this extension is given in picture 9, which is also half-scale,



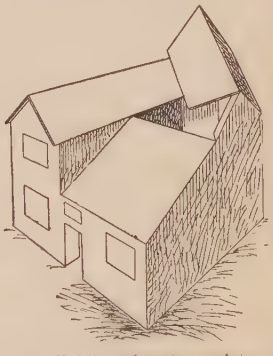
3. Folding up the walls



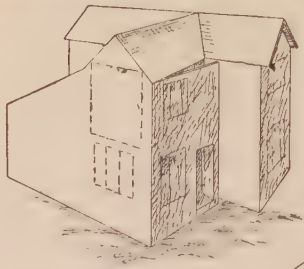
4. Sloping roof in position



5. Main roof in position

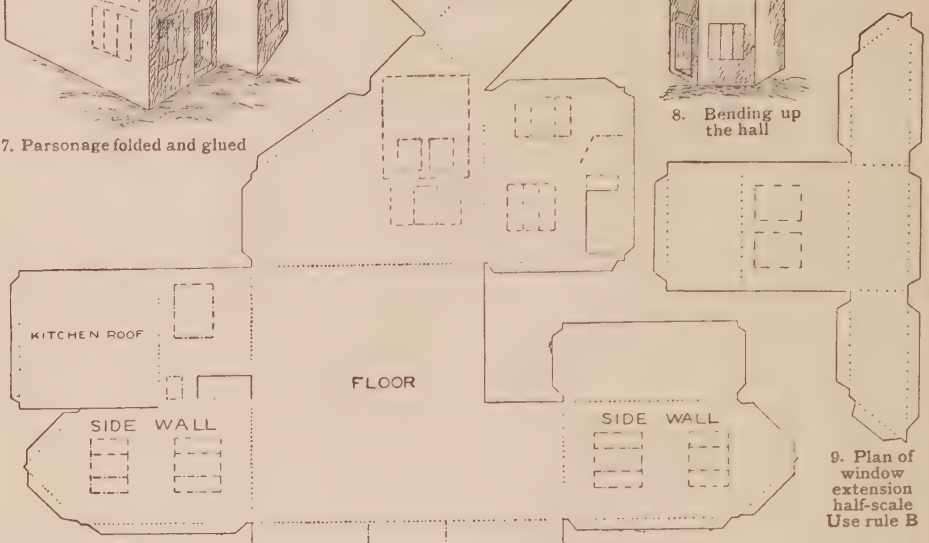


6. Folding almost complete

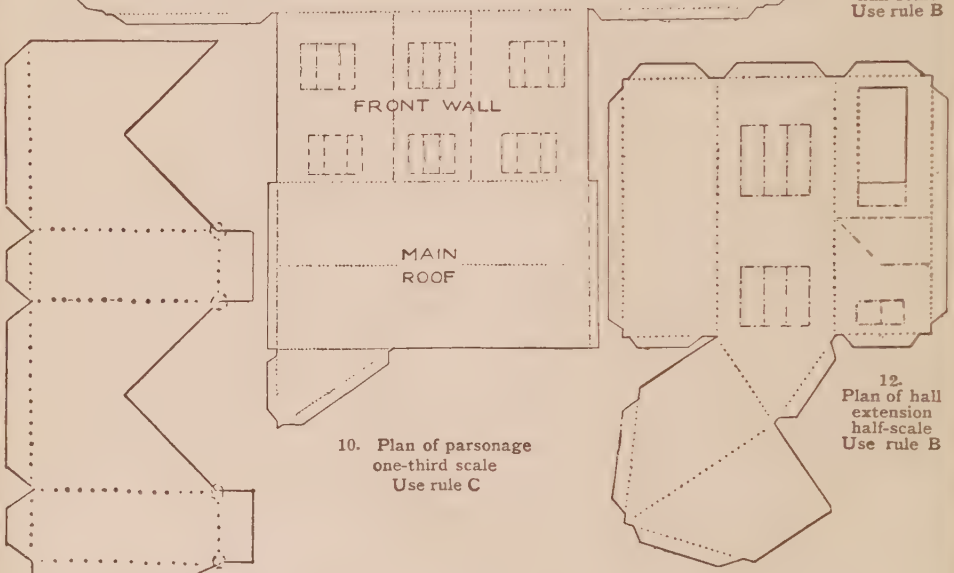


7. Parsonage folded and glued

8. Bending up the hall



9. Plan of window extension half-scale Use rule B



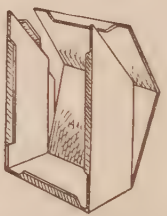
10. Plan of parsonage one-third scale Use rule C

11. Plan of chimney actual size

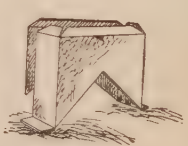
12. Plan of hall extension half-scale Use rule B

13. Plan of porch actual size

14. Plan of porch actual size



15. Bending up window extension



16. Folding the chimney

so that we again use scale-rule B. Picture 15 shows this piece from the inside as it is being bent up. After we have glued the slips of the sides to the front and allowed them to set hard, we glue the piece to the wall of the house in the place marked on the plan in picture 10. The view of the parsonage given in picture 2 shows the bay-window in its proper position.

The chimney comes next. Its plan in picture 11 is full size, so that we must use the full-sized rule both for taking the measurements from the picture and for making the drawing, or we may trace the plan, as we have seen how to do on page 445. In picture 16 the chimney is seen in the act of being folded. We have had good practice in making and fixing chimneys, so we know how to do it well. The two dotted lines which in plan 13 have a small circle at each end are cut half through, not on the side of the card on which the drawing is made, but upon the opposite side. In the plan in picture 10 is seen the place where the chimney must be glued on. There now remain only the two porch-covers to be made and put on. Their positions when fixed are seen in pictures 1 and 2, and the plans of them are given full size in pictures 13 and 14. We cut them out and glue them into place, and our parsonage is complete.

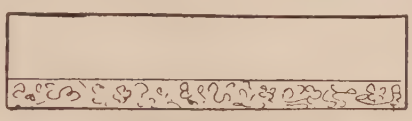
Photograph of Modeltown Parsonage as finished

We shall have the parsonage with a red roof to imitate tiles, and we have already seen in previous lessons how to paint the roof red. Then, as usual, we shall make the windows a dark blue, to look like glass, and we shall leave the walls white, merely putting red lines round the doors and windows where the wood framing would be if the house were real. The doors themselves we shall have red also, and the two porch-covers we shall have green, as they would be wood in a real house. The roof of the bedroom extension, however, we shall make red, like the roof. Our last picture is a photograph of a parsonage made as we have described.

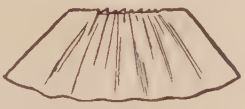
We shall next begin to make Modeltown Farm, which will require three lessons.

A BONNET FOR A BABY DOLL

If you have a baby doll, here is a pretty little bonnet made of a straight piece of material, as shown in picture 1. It is gathered on one side as shown in picture 2, leaving a straight piece on each side. When the thread is drawn quite tight, just as it has been drawn in picture 2, join together the two little straight pieces which you have left on each side of the gathers, and you will have the little round shape shown in the next picture (3), which is the back of our bonnet.



1. The pattern of the bonnet



2. The material gathered

3. The back of the bonnet

On each point of the front a ribbon should be sewn to fasten the bonnet under the chin.

To trim the little bonnet, put a flat piece of lace over the front edge of the bonnet, as shown in picture 1, whilst a tiny ruche, or frilling, of Valenciennes lace sewn inside all round will give a soft finish to suit the dimpled face of dolly.

A round piece of cardboard, about the size of a fifty-cent. piece, should be covered with the material and adorned with lace or feather-stitching to cover the gathers.

The two little bunches of ribbon which adorn the top of the hat are not quite so easy to make as they at first appear. Like everything else, there is a right way and a wrong way to make a ribbon bow, and the right way to make this one is to tie a little loop with strong thread (a long thread being required), bringing another loop by the side of the first one, then a third and a fourth, always twisting the same thread round and round the ribbon without using a needle, until the "chou" is quite formed, and is big enough to be put on the bonnet, where it should be secured with a couple of strong stitches. Good milliners boast of the fact that a needle never passes through their ribbons, and their bows are as fresh as if no hand had touched them.

4. The finished bonnet

Nearly all good milliners first make and trim their hats in muslin, which can be cut, sewn, done and undone until the shape is perfect, and that is the way in which you must first try to make this little bonnet. Try in muslin or crêpe paper, which is soft and elastic, and lends itself admirably to this sort of work.

BALL GAMES FOR THE GARDEN

CATCH-BALL

ANY number of players can join in this game. It simply consists of tossing the ball from one to another, but it may be made more exciting if no special plan is followed as to whom the ball is to be thrown next. This keeps everyone on the alert, and a very good trick is to look at some other player than the one you intend to throw to. This nearly always leads to a slip on the part of the catcher.

THROWING THE BASEBALL

THIS game is good practice for boys. A place from which to start the throw should be marked by pushing a stick into the ground. If two are taking part in it, to see who can throw farthest, it saves time and running about if, after the first throw, the second player takes his stand where the ball has fallen, and throws back from there. Other sticks or twigs should be used to mark the distance of each throw.

NINE HOLES

THOUGH this game is called Nine Holes, the number varies with the number of players. The holes are made in the ground side by side, and are numbered onwards from 1, one hole belonging to each boy. Every hole has three or more small stones, called eggs, placed in it.

Ten or twelve feet away a mark is made, and one of the players rolls the ball from this mark towards the holes beside which the rest are standing. Directly the ball drops into a hole all the players scatter as fast as they can, except the owner of that particular hole. He snatches out the ball and throws it at one of his running playmates. If he hits his mark, the boy who is hit loses one of the eggs from his hole, and in turn throws the ball at another player.

Every one who is hit loses an egg, and so does the thrower, *if he misses*. The player who is last to lose all his eggs is the winner.

FIVES

THIS is a game for two or four players. Draw on a flat brick wall a long chalk line, three feet six inches above the ground, and another one along the ground, ten feet from the foot of the wall. Then across each end of this last line, which should be about ten feet in length ; draw another at right angles to it, and connecting it with the wall. These lines are to show where the ball is to bounce.

The players divide into two parties—we will call them A and B. A throws the ball against the wall, where it must strike above the chalk line, and when, on springing back, it bounces from the ground, B must strike it with his open hand, sending it against the wall again. Then comes A's turn to hit it on the bounce, and this is kept up, turn by turn, until someone makes a slip.

If the ball strikes beneath the chalk line, or rebounds *outside* the ground-lines, the side that did *not* make this mistake counts 1 to itself. The side that first reaches 12 or 24 marks wins, but any number may be chosen as the players decide.

EGG HAT

THE caps of the players are laid in a row on the ground at the foot of a wall ; they should be tilted a little, so as to make it easier to toss a ball into them. The players then stand in a row at a line about eight steps away, and one of them pitches the ball at the hats. The moment this is done they all scatter, except the boy who owns the hat it has fallen into.

He must take out the ball as quickly as possible and throw it at one of the other players. If it hits him this boy must, in turn, pitch the ball at the hats.

But if the thrower misses him, a small pebble is placed in his cap as a bad mark, and when any player has missed so often that the number of pebbles in his cap equal the number of players, he is made to stand at a short distance while the rest throw the ball at him, each in turn. The game then starts afresh.

A pebble should also be added for every time a player fails to toss the ball into a hat.

CROSS-BALL

CROSS-BALL should be played by two players standing two or three yards apart. They should start with two balls, and should each toss at the same time so that the balls pass in mid-air. It requires quickness of sight and hand to keep this up, but a little practice will make it easy, and by-and-by a third ball may be added, when the effect is very pretty.

Chestnuts, or any small round objects that are not heavy, or too hard, are better for this game than balls, as they are quickly and easily handled. If the players count aloud as they throw, their actions will become more regular, and slips less frequent.

TRAP-BALL

THE trap can be made of a flat piece of wood about nine inches long and two or three inches wide, with a small hollow scooped near one end. Place this piece of wood on the ground, with some twig or small stone under it, so that the end opposite to the scoop is tilted up. Then lay the ball in the scoop and strike the lifted end sharply with a stick.

This will throw the ball into the air, and before it falls again the player must hit it with his stick. If he fails to do this twice, or hits it so that the ball is caught by another player, he is out, and the next takes his turn.

POSTURE

ALL the players stand in a large circle three or four yards apart, and throw the ball from one to another as rapidly as possible. Those who fail to catch it must remain as though turned to stone in the attitude in which they dropped the ball. The last to miss wins the game, and the rest must not change their positions until this winner has thrown the ball up and caught it ten times.

HOW TO FIND YOUR WAY IN A FOREST

Most of us at some time or other during our holiday rambles have been lost in a forest or wood. Perhaps it is raining hard, and we are hurrying for shelter, or we want to catch a train, and, in an endeavour to save time, have left the pathway. Then it is that, unless we have a compass, or know how to read Nature's signposts, we may wander about aimlessly for hours.

But we need not be lost in the wood, for Nature has supplied us with an unfailing series of signs, which, if known and studied, show us the north, south, east, and west as clearly and truly as any compass.

Find a full-grown tree that stands slightly apart from its fellows. Now carefully look at the bark. It will be harder, lighter, and drier on the south side; while on the north side it will be considerably darker in tone, and often at the roots on the north side we shall find a clump of moss. Nearly all hardwood-trees, such as the oak, the ash, and the elm, have moss growing on the north side; while on that side the leaves are longer, of darker green, and have lighter veins than those found on the south side. One of the surest ways of discovering the compass points is to find a sawn or cut stump. The rings of wood in the section will be found thicker on the south side than on the north, so that the heart of the stump is nearer the north side.

Stones that have rested in the same spot for some time usually have moss on the side facing north, while at best on the south side we shall find only a thin covering of harsh, half-dried moss. On the north side of a hill, ferns, mosses, and late flowers grow, and this side is at all times greener with vegetation. In winter nests of insects will be found in the crevices on the south side of trees with rough bark.

If we are on a marsh, small bushes will act as compasses, their leaves and limbs showing the same differences as we have seen on the trees in the wood. If we catch sight of a telegraph-pole, it is worth while to remember that the crosspieces of wood are usually on the side of the pole nearest the terminal city.

THE MAGICIAN'S JACKET

It is always well for a conjurer to give his trick a name that is likely to deceive his audience, and we may impress our friends by calling the trick we are about to describe the magician's jacket.

The magician's jacket has nothing magical about it at all. It is only an ordinary jacket, such as any boy wears. In this trick it is not the conjurer who really does the trick; it is the member of his audience whom he asks to assist him, and who acts as an accomplice quite without knowing it. The trick is that the conjurer asks any one of his audience to tie his hands together behind his back with a piece of strong string, and after he has had his hands securely tied he takes off his jacket, and afterwards shows that his hands are securely tied, just as they were before. This looks impossible; but we shall see how it can be done easily.

1. One wrist tied

2. Both wrists tied

The conjurer takes a piece of string. It should be rather hard string — not the soft, pliable kind —but need not be too thick. The length should be about 18 inches. He then asks someone to tie one end of it round one of his wrists, as seen in picture 1. Then, putting his two hands behind his back, he asks that his other wrist may be tied with the other end of the string in the same way, leaving just a few inches between the two wrists. It is while this is being done that the conjurer manages so that the friend who is making the knot acts as an unconscious accomplice. While the second wrist is being tied, as seen in picture 2, the conjurer *pulls the two wrists apart, so that the string between them is quite tight.* This causes the friend, unknown to himself, to tie a slip-knot, which, however, does not look like a slip-knot. Now comes the anxious time. First, the conjurer asks someone to fold his jacket back from his shoulders, as he cannot get his hands to his own shoulders. Then he stands back a little distance, so that the audience may not detect what he is doing. He puts one finger of the hand that was tied first behind the knot of the second wrist, as seen in picture 3, and a little pull will enable him to widen the loop

3. Slipping the hand

round the wrist, so as to be able to withdraw the wrist from the loop. When he has done this his two hands are no longer tied together, but he must be careful not to let the audience see this. He pulls off his jacket without showing his hands, and, as the jacket falls behind him, he must be careful to replace his free wrist in the free loop before showing that he has succeeded in getting his jacket off.

The best way for him to do this is to go down on his knees with his jacket behind him, and to do it while his hands are concealed by his jacket. Then, when he has got his wrist in the loop again, and has pulled up the loop tight as it was before, he comes forward, with his jacket in one hand, and receives the applause which he deserves. He asks the friend who tied the knot, and anyone else who cares, to examine it, and say if it is as it was before. Then he asks someone to cut the string from his wrists.

This is an entertaining trick, and practice will enable any man or boy to hold his wrists so that his friend cannot help making a sliding knot. But it should be practised a few times before being shown in public. Nothing is more damaging to the reputation of a conjurer, whether professional or amateur, than a clumsily performed trick, and a little time spent in acquiring perfection is always advisable.

LITTLE PROBLEMS FOR CLEVER PEOPLE

THESE problems are continued from page 1512 and the answers below refer to the problems on that page.

HOW MUCH FOR A HORSE AND A COW?

76. "I have just sold nine horses and seven cows for $1,500," said Farmer Giles. "I suppose you got more for each horse than you did for each cow?" asked his friend. "Yes, I got double," replied the farmer.

What was the price of the animals?

WHO WAS RIGHT?

77. "There is only one more wicket to fall," said a boy who was watching a cricket match, as the ninth man was going in. "No," said another boy, "there are two." "You are both wrong," said a third boy; "there are three."

Which of the three boys was correct?

HOW MUCH DID THE GROCER LOSE?

78. Said the grocer, "One of my customers has failed, and I have lost a good customer. I used to sell him tea at 60 per cent. profit on cost price. He is going to pay 62½ cents on the dollar.

How much did the grocer lose?

WHAT WAS ITS PRICE?

79. "During sale week," said the merchant to a customer, "we will allow 20 per cent. off the prices marked on the goods, but next week after the sale is over we will allow only 5 per cent. discount." After the sale was over the lady bought something, and paid for it $3 more than it would have cost during the sale.

What was the marked price?

WHAT WAS THE PRICE OF BACON?

80. "You can take this piece of bacon and 50 eggs for 6s. 8d.," said the provision dealer. "I have only 3s. 4d.," said the boy. "Well, take half of the bacon and 25 eggs," replied the man. "No," said the boy "I will take the whole of the bacon and 10 eggs." The provision dealer agreed to this arrangement.

What was the price of the bacon?

THE ANSWERS TO THE PROBLEMS ON PAGE 1512

70. The question is "What does y-e-s spell?"

71. The profit of three handkerchiefs sold at 4d. each is the same as the profit of one handkerchief sold at 4½d. Therefore the profit of one at 4½d. must have been three times the profit of one at 4d., and the difference between 4d. and 4½d. must have been equal to the profit of two at 4d. Thus the profit of one at 4d. must have been ¼d., and the handkerchiefs must have cost 3¾d. each.

72. If Brown had taken all the luggage he would have paid $1.20 more excess than he did. Therefore $1.20 would have been the excess charge on 120 lb., which is 1 cent per pound. As Smith paid 20 cents excess upon a total weight of 120 lb., his excess weight at 1 cent per pound, must have been 20 lb., so that 100 lb. was the weight allowed free. As Brown paid 30 cents excess for the share he took himself, that share must have been 100 lb. plus the number of cents in 30 cents, or 130 lb., so that the total weight of luggage was 250 lb.

73. Brown saved $3.60, which, with coal at $6.00 a ton, was the price of 12 cwt. of coal. As he received 1 cwt. per ton more than exact weight, he must have ordered 12 tons and received 12 tons 12 cwt.

74. The boatman got 40 cents from the two extra passengers, but as his total profit was only 10 cents more by having the two extra passengers, the reduction of 5 cents each to the other passengers must have come to 30 cents altogether, so that there must have been six passengers in the original number or 8 in all.

75. If the church clock struck three in the same time as the town-hall clock struck two, the interval between the strokes of the town-hall clock must have been twice as long as the intervals between the strokes of the church clock. Thus the clocks would strike together at all alternate strokes. As they struck 1 together, the church clock would strike 3 when the town-hall clock struck 2; the town-hall clock would then have only one more stroke to make to tell the hour. Then the church clock would strike 5 as the town-hall clock struck 3, and the latter would have two more strokes to make to tell the hour.

Thus the time was 5 o'clock.

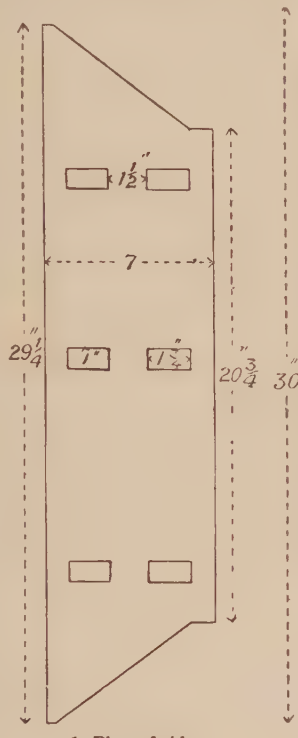
Answers to the above Problems are on page 1619

MAKING A SET OF BOOKSHELVES

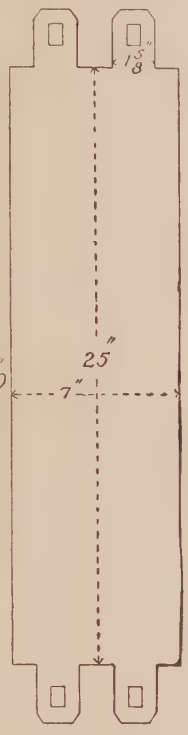
In proceeding with our carpentry work, we must not proceed too rapidly. We shall do better work if we make very simple things at first. Another point to keep in mind is the utility of the articles we set ourselves to make. Here we shall see how to make an exceedingly useful article—a set of hanging bookshelves—which we can attach to the wall.

Everyone can use an article of this kind, and everyone with ordinary intelligence and the necessary tools can make one. The sizes given in the sketches are good useful sizes, but the best sizes for the article to be made depend upon the space available for its accommodation. Thus everyone who makes the bookshelves from these sketches must first decide if these sizes are the best in his individual case, and if they are not he must modify the sizes given to suit his own case.

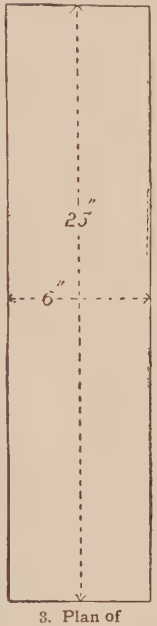
We have first to decide what kind of wood we shall use. We could use oak, beech, or birch — perhaps oak looks better than the other two for the purpose—but all these are hard woods, and it will be much easier for us to use a soft wood, such as pine. Hard woods are much more difficult to work. We can use soft wood, and after the shelves are made we can stain them to imitate any of the harder and more expensive woods.



1. Plan of sides



2. Plan of shelves



3. Plan of back piece

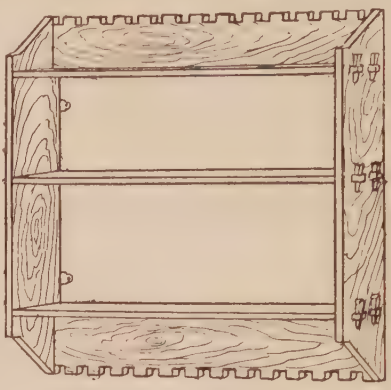
4. Dowel

In picture 1 we show one side of our hanging bookshelves with all the sizes marked on it. We first cut out two pieces of the wood we are using—pine, for instance—to this shape. They must be fairly strong, and we should make them so that the finished thickness shall be not less than one inch, so we had better use wood 1⅛ inch thick and reduce it to one inch by planing it. The holes in the sides we can make with our chisel, and we must be particularly careful that each pair of holes is exactly in the same horizontal line, so that the shelves may be quite flat. We must also see that the two sides are exactly alike. Having cut our two pieces, we must finish them carefully with the plane so as to have them true and smooth, afterwards rubbing them well with sand-paper, or glass-paper, these being two names for the same material. We should use No. 1 sand-paper first, rubbing the surface and edges carefully until they are as uniformly smooth as the sand-paper can make them, and then we use No. 0 sand-paper, which will give them the final touches. It is more important to have the sides smooth than it is to have the shelves smooth, because the former are more exposed to view.

Having made the sides, we turn our attention to the shelves, of which we shall make three. We shall make them all alike, and thereby simplify matters. Picture 2 shows the shape and the sizes to which we should make them. The thickness of these pieces when finished should not be less than ¾ inch and preferably ⅞ inch, so that the wood, when we begin, should be thicker than this, to allow us to have this thickness when our planing and sand-papering are finished. Having made the shelves, we fit them into the sides so that the ends go through the holes we made in the sides, and if they do not quite fit we must make them fit. We shall want twelve taper pins, or *dowels*, for the holes in the ends of the shelves to cause them to retain their position in the sides, and these pins we can easily make. It will be much better if they are of hard wood—say, oak, beech, birch, mahogany, or walnut—even if the sides and shelves are of soft wood. There is more strain upon the dowels than upon the other parts, and as they are smaller, strength is necessary. The shape and size of dowel necessary are given in picture 4.

The shelves would do as they now are, but would be liable to twist unless we

strengthened them, and we shall do this by two back pieces, one above the top shelf and another below the bottom shelf. Picture 3 shows the sizes for these pieces, both of which are alike. Having cut them out and finished them, we nail them on, one above the top shelf and one under the bottom shelf. Our set of shelves is now complete as far as carpentry goes. If we buy at the hardware merchants' 4 mirror plates, we can attach the shelves to the wall by their means. We must attach these mirror plates to the sides and not to the shelves. We put two at each side, as seen in picture 5. These would do well enough if they were put on to stick outwards, but in that case they would be seen when the shelves are attached to the wall. By putting them on as indicated in picture 5, the shelves will look much better when they are fixed in the place they are to occupy.



5. The completed bookshelves

If we have used pine or other soft wood, we can stain the shelves any colour we prefer, and can imitate mahogany, rosewood, walnut, or ebony. We purchase any of these stains in either small or large bottles, and apply it with a brush. Then we can put on some French polish if we wish to give the article an extra fine finish and can afford the modest expense. There are several other ways in which we can ornament the bookshelves. We may, if we like, make the top and bottom pieces "embattled" or "dentilated," as it is called, by cutting out pieces and leaving teeth-like projectors as shown in picture 5. We can carve the sides, or we can stain them with a pattern, using stencils, or we can burn some ornamentation, using a hot iron, or, finally, we can, if we wish, put some ornamental or imitation leather shelf-edging along the front of the shelves. Whether we decide to decorate in any of these ways or not, we shall have an article of wall furniture which we shall find very convenient, and of which we shall feel very proud, because we have made it ourselves.

THE MYSTERIOUS CHINESE BAT

This is a miniature cricket-bat, 6 in. long, as illustrated in the picture. In a row down its centre, about half an inch apart, are three small holes, visible on each side, and bored, apparently, right through it. But things are not always what they seem, especially in conjuring. A comparision of picture 1, representing a front view, and picture 2, representing a back view of the bat, will show how, in this case, the reality differs from the appearance. Of the three holes, A, B, and C, shown in the front view, only B and C are genuine, so to speak, A being a mere make-believe, going only half-way through the wood. On the other side of the bat, in a line with B and C, but half an inch nearer the lower end, is another dummy hole, D.

With the bat is used a little peg of wood, bone, or ivory, in length about three times the thickness of the bat, and just fitting comfortably into either of the holes B and C.

To show the trick, we, in the first place, call attention to the bat, asking the company to notice that there are three holes through it, as appears to be the case. We likewise exhibit the peg, which we may introduce with the remark that some of the company have no doubt seen the curious "jumping beans" which have been such a puzzle to naturalists, and that this little peg is a "jumping peg." Whether the motive power is the same in both cases you must leave the audience to decide.

1. Front view 2. Back view

The mysterious bat

We may here remark that whenever a conjurer can introduce in his "talkee-talkee" of a trick some little scientific fact having a resemblance, however remote, to the effect he is about to produce, he should not fail to do so. If we can start people on a wrong scent, they are all the less likely to hit upon the true one.

But to return to our jumping peg. The performer puts it, from the front, into the hole B in such a manner that it shall project equally on each side. Holding the bat upright, he asks everybody to take notice that he has put it in the centre hole. He then lowers the bat as if to show the opposite face of it, but, as he does so, gives the handle a half-turn between his fingers. The effect of this is that *the same side* is still visible.

"Now," he says, "I shall command the peg to jump out of the middle hole and into the top hole." Under cover of a wave of the arm, he gives the bat another half-turn, thereby bringing the reverse side into view. On this side B is the *top* hole; and the peg appears to have jumped accordingly.

"Once more," he says, "we will place the peg in the middle hole." He then transfers it to C, which on the side now visible is the middle hole. Again he shows, apparently, both sides of the bat, then commands the peg to jump, and makes the final half-turn as before, when the peg is seen to have jumped into the lowermost hole.

THE WAY THAT THE FROGS JUMPED

HAVE you been able to find out how the three frogs jumped, or are they patiently waiting on their tumblers for the word of command, as in the picture on page 1609?

Of course the three frogs could easily jump into the places of three others, but that is not allowed; nor may a frog choose a seat which has had a frog on it, for each frog could leave a ticket behind with "Reserved" on it. Then, too, they must jump each on to a tumbler where it will be out of line with any other frog, either up, down, sideways or crossways.

You will notice that there is a frog in each row already, and so if three of them jump out of their rows into other rows, the frogs already in those rows must jump also.

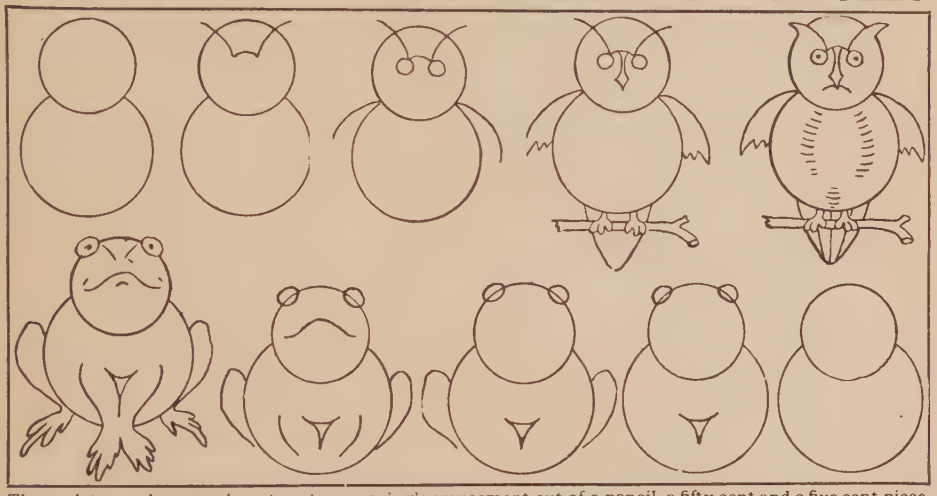
How can it be managed? Well, there is nothing for it but trying each of the eight frogs in turn. Perhaps it will help if you give the frogs names, and when you have lifted them off the tumblers and are trying to find them seats you might put pieces of paper on the vacant tumblers, with the names of the frogs on them, so that you do not forget where they came from.

Suppose we name the frogs Jack, Dorothy, Alfred, Ethel, Lionel, Alice, Percy, and Jessie.

The three frogs who are going to jump are Alfred, in the third row from the top, Ethel, who is seated on the tumbler at the end of the fourth row, looking as if she were quite ready for a jump, and Percy, about the middle of the seventh row.

Alfred, Ethel, and Percy jump in this way: Alfred, who is quite a young, sprightly froggy, lands on the second tumbler in the seventh row down; Ethel, who was badly wanting a little jump, gently lands on the eighth tumbler of the third row, the one just above hers; Percy, who is noted for his high jumps, lands on the fourth tumbler in the fourth row. That is the only way in which the frogs could jump.

AN OWL AND A FROG MADE FROM CIRCLES



These pictures show you how to get an evening's amusement out of a pencil, a fifty cent and a five cent piece. Beginning at the left of the top row, we see how to build up an owl from two circles made by drawing a line round a fifty cent and a five cent piece; and the lower row, beginning on the right, shows how to make a frog.

THE ANSWERS TO THE PROBLEMS ON PAGE 1616

76. The price of one horse equalled the price of two cows, so that nine horses and seven cows would be the same price as 25 cows. If 25 cows fetched $1,500, each cow was worth $60, and as each horse was worth double, the price of each horse was $120.

77. The third boy was right. When the ninth man went in, the eighth man was still batting, and the eighth, ninth, and tenth men had to go out.

78. Sixty per cent. of 62½ cents is 37½ cents, so that for tea that cost the grocer 62½ cents he had received 62½ cents + 37½ cents, which equals $1. The bankrupt paid 62½ cents on the dollar, so as this amount was the grocer's cost price, the grocer lost nothing.

79. The difference between 5 per cent. and 20 per cent. is 15 per cent. The difference upon the article purchased was $3, so we must find of what sum $3 is 15 per cent. Three dollars is 15 per cent. of $20, so that the marked price was $20, which would have been reduced to $16 during the sale, but only to $19 after the sale was over.

80. Since the whole piece of bacon and 10 eggs cost as much as half the bacon and 25 eggs, it is clear that half the bacon equals 15 eggs and the whole piece of bacon equals 30 eggs. As 50 eggs were offered with the bacon for 6s. 8d., the same sum would buy 80 eggs (30+50). Thus the eggs were one penny each, so that the 50 eggs offered with the bacon represented 4s. 2d.

Thus the price of the bacon may be known by deducting 4s. 2d. from 6s. 8d., and it was therefore 2s. 6d.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 1717

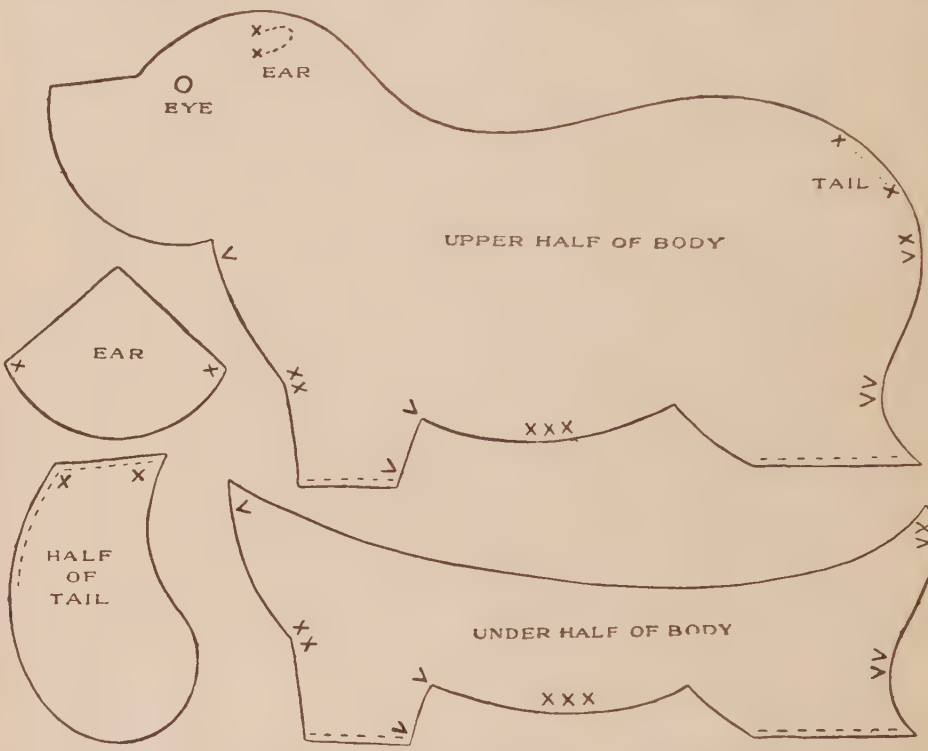
A DOG FOR OUR TOY ZOO

THE dog which is shown in the picture was made of a piece of curly brown astrachan cloth, but if you are going to trace this pattern, and not enlarge it, you should choose a less clumsy material. He has no nose-piece, and the leg-pieces are cut off, like the lion's, a little below the body, and left open at the dotted line. The wood for each leg is about two inches long, and as thick as a *thin* slate-pencil. It is wrapped in a piece of the stuff half an inch longer than itself at one end, and securely fastened to the wood at the other, so that the little stick cannot slip out of its case, as described for the making of the lion. Astrachan does not fray, and may,

The dog for our toy Zoo

to form the foot. When you fix the legs into the holes left for them, be careful that the toes all point the right way. The edges of the thigh parts may be carefully hemmed down raw-edged on to the leg, and any of the thigh part that is too large must be kept to the back, and stitched across to form a joint.

The dog's tail can be stitched up on the wrong side, and if it is left open at the dotted line it can be turned, and after a little stuffing has been put in, this opening can be finished on the right side. The tail should be put on before the back seam is stitched up. The dog's ears are left raw-edged, and not lined. The nose is a bead, sewn on and covered



for the legs, be sewn raw-edged on the right side. The piece of stuff that is too long must be rounded off, sewn round, and caught back by a stitch or two at right angles with the leg with Prout's glue, in which two nostrils are pierced with the point of a pair of scissors while it is soft. The eyes are jet beads, and the mouth is shiny black thread.

A NEW SONG OF A SHIRT

With fingers weary and worn
With eyelids heavy and red
A woman sat, in unwomanly rags,
Plying her needle and thread, —
Stitch! stitch! stitch!
In poverty, hunger and dirt;
And still with a voice of dolorous pitch
She sang the "Song of the Shirt!"

"Work — work — work —
Till the brain begins to swim!
Work — work — work —
Till the eyes are heavy and dim!
Seam, and gusset, and band,
Band, and gusset, and seam, —
Till over the buttons I fall asleep,
And sew them on in a dream!"

Needlework is as old as human history. It began with the crude apron of fig leaves that Eve sewed for herself in the Garden of Eden. Our prehistoric ancestors used thorns to join their garments together, and many of the Indians and the Eskimo of today still use this primitive method of sewing. We learn from the Bible that needles were used in Palestine before the Tabernacle was built. Yet, strange to say, it was not until the eighteenth century that anyone thought of superseding manual labour in the matter of stitching.

Women who earned their bread by sewing wore their eyes — yes, their lives — out in trying to make enough to keep body and soul together. The pay for piece work was small and at the best, working from early morning until late into the night, the amount of sewing accomplished was necessarily very little. In 1844 Thomas Hood wrote and published his famous "Song of the Shirt," picturing the pitiful drudgery of the poor women who were forced to earn a livelihood by their needles.

AMERICA'S CHIEF CONTRIBUTION TO CIVILISATION

It was a Yankee who invented the first practical device for mechanical sewing, yet the present sewing machine was the outgrowth of the efforts of many clever men of many countries. For a hundred years or more before the first successful machine was placed on the market, the idea of such a machine had been the cherished dream of a number of inventors.

WHAT A GERMAN, AN ENGLISHMAN AND A FRENCHMAN CONTRIBUTED TOWARD THE GROWTH OF A GREAT IDEA

The earliest known attempt at a mechanical sewing device was patented on July 24, 1755, by a German tailor by the name of Charles F. Weisenthal. It was a queer little machine, with a needle having two points and an eye in the middle.

The next sewing machine was made by Thomas Saint, a London cabinet maker, who described it as a machine for "quilting, stitching and making shoes, boots, spatter dashes, clogs and other articles." This leather sewing machine, rude and impractical as it was, was the real forerunner of the useful American invention.

An Englishman named Duncan and an American clergyman by the name of Dodge next tried their hands at the matter. The first patent issued in America was procured by a man named Lye in 1826. All records of his machine were destroyed in the fire that burned the Patent Office in 1836.

It was a Parisian who made the next really valuable contribution toward the movement. His name was Barthémy Thimonier, a picture of whose machine can be seen on another page. How queer and awkward it looks! Yet eight hundred of these machines made of wood were said to have been used at one time in Paris for the making of army clothing. However, as may well be imagined,

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it had far too many defects to become more than another important step in a great movement.

In the years that followed several other inventors gave all their thought toward the completing of a sewing machine that would be of real help to mankind — among them, Walter Hunt, George A. Arrowsmith, John J. Greenough, R. W. Bean, George R. Corliss — all Americans.

ELIAS HOWE AND THE FIRST PRACTICAL SEWING MACHINE

The honour of producing the first really practical sewing machine belongs to Elias Howe, a humble mechanic in a small Massachusetts town. When a lad of twenty-one, the idea occurred to him of passing thread to and fro through a cloth and securing it on the other side. Having no money to experiment with, Howe's tests were necessarily of a very limited kind, made in the little garret that he called his home.

One day, however, Howe went to board with an old schoolfellow named Fisher. The young inventor was bubbling over with his wonderful new idea. Surely he would succeed if he only had the money. Fisher offered him the loan of $500 to help him in carrying out his plans making an agreement whereby he was to receive half the profits if the invention proved a success. "The one provided brains and the other money and between them in April, 1845, they finished the first real sewing machine."

Wild with delight at his success and fully confident of his ground, Howe began to "boom" his invention by challenging five of the most expert hand sewers in a large Boston clothing factory to a sewing match. Howe boldly undertook to sew five strips of cloth on his new machine before any one of the men had completed one strip. His challenge was greeted with jeers of derision. The men smiled confidently to themselves as the match opened. Presently their smiles vanished. They bent feverishly over their work. The machine was gaining — gaining. The time was up before the men half realised what had happened. Five strips of white sewn cloth lay beside the new machine. The men looked at them dazedly and then at the half completed strips in their own hands. An indignant murmur swept over the crowd of workingmen gathering watching about. It slowly swelled to a hoarse ominous cry:

"Smash the machine! Smash the d—— machine! It will take the bread out of the mouths of honest workingmen."

It was with great difficulty that Howe, his precious machine tucked under his arm, finally escaped from the angry mob.

The following five years were ones of poverty and struggle to Howe. He and his partner patented the machine and for a while Howe toured the country, exhibiting it at fairs for a trifling admission fee. People flocked to see the "clever toy," but no one would believe that it could really do practical work. Failing to secure recognition of its value in the United States, in 1846 Howe carried his machine over to England. There a London staymaker bought the right to patent it and engaged Howe's services at the rate of $15 per week. Howe failed to accomplish what the staymaker wanted, and, after wasting a good deal of money in experiments, the man abandoned Howe and his invention in disgust. Howe was thus left stranded again and he returned to America poorer than ever, leaving his machine behind him in pawn in order to get the money to pay his passage home. And yet there were "millions in it!"

When Howe got back to the United States he found a number of ingenious people engaged in producing, or experimenting in sewing machines, and some of them were infringing on his own patent rights. After much heartbreaking delay, Howe somehow succeeded in raising enough money to redeem his pawned machine in England, and then he began actions against all who were infringing on his patent. He spent long years in hard and bitter legal fighting, but in the end he won, and obtained the right to secure a royalty or percentage from several

A FACTORY WHERE THOUSANDS OF MACHINES ARE MADE

The first sewing machines were built in small shops and the work was done almost entirely with hand tools. The demand for the machines has increased until American machines are sold in every civilised country and in many countries where the people have hardly escaped from barbarism. The picture represents only a small part of one room in a great factory where thousands of machines are made every year. The parts are made so accurately that a machine can be put together and started running in a few moments. Very rarely does any of the parts require attention though, of course, they must be adjusted. There are many other factories as large as this.

sewing machine manufacturing companies. After all his poverty and brave-hearted struggle under every sort of difficulty, money poured in, and Howe lived to be a very successful and wealthy man.

What a Poor Boston Mechanic Did for the World

Meanwhile clever men in England and America were busy trying to simplify the sewing machine then on the market. Morey, Drake and Fisher in England; and Wilson and Singer in America were doing all in their power to make the invention practical and easy to work.

The sewing machine was still a heavy, awkward thing when Isaac Singer, a poor millwright employed in a Boston factory, first took hold of it. One day when Singer was at work, a sewing machine came to the factory for repairs. The young mechanic carefully inspected its big, clumsy mechanism.

"I believe I could make a better sewing machine than that myself," he exclaimed with deep conviction.

From that moment Singer became a dreamer of dreams and the subject of his dreams was a Sewing Machine — a sewing machine that would sew with a marvellous ease and speed and lightness. Full of enthusiasm, he induced two other Boston workmen to invest in his visionary enterprise. One gave him all his capital — forty dollars; the other loaned the use of his tools and workshop.

Day and night Singer toiled away upon his wonderful idea — toiled absorbedly — feverishly — for the time was short and "the machine must be built on forty dollars or not be built at all."

The crisis was reached at last. One sultry August night in a little room in a back Boston street, three men met — three men whose all was invested in the little machine that lay on the table before them. The hour of trial had come! The machine had been put together that day and it lay before them complete in its smallest part. Hope, eagerness, anxiety struggled in the faces of the men, as they bent forward breathlessly. Singer carefully adjusted the working gear. He started it going. *It did not work*!

First one and then the other of his companions left the broken-hearted inventor with his failure, alone in the shop at midnight. So this was the end of all his dreams — a useless mass of iron and steel — a machine that would not work! Yet surely, surely, his main idea was right. Sick with anxiety and want of sleep, and yet with a clinging faith in his idea, the man worked over the machine. At last, worn-out and half dazed with sleep, Singer turned his back on his golden dreams and started through the cold gray of the morning for his lodging. Half way home he stopped short. Wait! Wait! Could it be that he had it!

"The loose loops of the thread are all on the upper side of the cloth," he muttered to himself.

Like a flash he knew what the trouble was. His mind was alert and clear in an instant. Almost at a run he returned to the shop. With shaking fingers he re-lit his lamp. His breath came in short, feverish gasps as he bent over his machine. He carefully tightened a delicate little tension screw. In a few minutes the Isaac Merritt Singer sewing machine was working!

Other Improvements

Singer was the first to apply the use of the foot treadle to the sewing machine, replacing the old fashioned hand crank wheel of former machines. A few years later W. E. Baker and W. O. Grover patented a machine that made a double chain stitch and shortly after James E. A. Gibbs put his single chain stitch machine on the market.

Since the days of Elias Howe and his invention of the first practical sewing machine the number of patents taken out for sewing machines has been legion — certainly not less than one hundred thousand — and probably more. There is scarcely a household in our land without a sewing machine. In the sewing machine we have America's answer to Thomas Hood's "Song of the Shirt."